

Medical and other notes collected on a holiday tour to Arcachon, Biarritz, Pau, and the principal watering places in the Pyrenees / by Dr. Roth.

Contributors

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Royal College of Physicians of Edinburgh

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MEDICAL AND OTHER NOTES

COLLECTED ON A HOLIDAY TOUR TO

ARCACHON, BIARRITZ, PAU,

AND

THE PRINCIPAL WATERING PLACES

IN

THE PYRENEES.

BY

DR. ROTH.



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HOLIDAY TOUR IN THE PYRENEES.

THE following notes, made for my own use, are published at the wish of several of my friends; they have been collected partly from my own observations and partly from the interviews which I had with my professional brethren, who, without any formal introductions, answered all my inquiries with the greatest promptitude, and I have much pleasure in thanking them herewith publicly for their kindness; I have also taken extracts from several pamphlets, the titles of which I have named, in order to enable those wishing to know more, to obtain the required information.

After the labours of the Great International Congress of Hygiène at Paris were finished, I proposed visiting the watering places of the Pyrenees, which in general are very little known to the majority of English practitioners, who, therefore, make very little use of them, although many of their patients might be benefited both by the waters and climate. French physicians practising as consulting physicians at the numerous French watering places object to *faire la reclame* as many German medical men do, many of whom yearly visit England in order to introduce themselves and their waters to the profession; if the French would only imitate the practice of their German colleagues there is no doubt that the present prevailing ignorance regarding French mineral-waters and watering-places would be considerably diminished. Only very few English practitioners visit the watering-places in the Pyrenees, and this is another reason why such a small number of English patients are

sent there; English continental residents resort more frequently to these waters.

We left Paris in the evening and arrived two hours later at Orleans, made the tour of the town in the morning, and having seen the statue of the Maid of Orleans, and the houses of Agnes Sorel and some other celebrities, we continued our journey through one of the most fertile parts of France, including the interesting towns of Blois and Angoulême, to Bordeaux, where we arrived the same evening in time to take a drive and have a look at this apparently very rich town; its flourishing state, I was told, is owing principally to its commerce with England, and its large export of Bordeaux wines.

ARCACHON.

AN hour's railway journey from Bordeaux brought us to Arcachon, where about 100,000 people resort annually for the sea bathing, while a considerable number of patients suffering from asthma, consumption, bronchial catarrh, and other complaints, pass the winter in the pine-forest, which has an average temperature of 10° C. in winter, and 26° C. in summer; on the seacoast the winter average is 8° and the summer 20° . Besides the Grand Hotel there are many other hotels, private houses, and in the forest beautiful villas ready for the accommodation of visitors; a beautiful casino, built in oriental style and standing in its own grounds, provides various amusements as well as hydro-pathic treatment and baths of sea and ordinary water, also resinous baths, water mixed with the sap of pine trees. By chance I got an introduction to the present proprietor of the renowned villa Pereira, the grounds of which are beautifully laid out; I here had an opportunity of meeting an asthmatic patient who is only well in Arcachon; the uncomfortable symptoms returning when leaving the place. Dr. Hameau, who has been acting for many years as *Médecin Inspecteur*, told me that he has only seen one real cure of consumption in this place, which he has described in his pamphlet on Arcachon; but many patients with asthma and chronic catarrh of the bronchial mucous mem-

branes, and all with *erethistic* temperament have been frequently relieved and cured; Dr. Hameau was kind enough to give me a copy of his pamphlet, from which the following notes are taken.

The climate of Arcachon,* comprised in the Girondin climate, is analogous to that of Bordeaux as regards general influences, but with peculiarities which are owing to—

1. The proximity of the sea, from which Arcachon is separated, due west, only by a series of *dunes* covered with pine forest, and by the large harbour of the *Bassin*, which has its opening to the south.
2. The obstacle which this forest opposes to the force of the west, south-west, south south-east, and east winds.
3. The extent of the *Bassin* over which the north and north-east winds must pass in order to reach Arcachon, being thus charged with a certain degree of moisture, tending to correct their parching action, which cools them in summer, and warms them in winter.
4. The temperature of the sea, which is higher than that of the air during the cold season and lower during the hot.
5. The evergreen shelter of the pine-forest, a shelter quite insufficient to ward off the heat of the sun when shade is sought, but which rather augments its intensity by the calmness of the air both in winter and summer.
6. The hygrometric state of the atmosphere, which would present a disagreeable humidity did not the extremely porous soil render any stagnation of water impossible.
7. The very remarkable ozonometric state, which reaches the highest degree of Bérigny's scale, in the forest during the winter.
8. The vegetation rich and green at all times.
9. The presence of resinous emanations.
10. The slight elevation of the ground above the level of the sea, and consequently the greatest possible barometric pressure.

Like all maritime climates, especially those of the west coast of Europe, near which the Gulf Stream passes, the

* '*The Climate of Arcachon*,' by Dr. S. Hameau, an English translation, by J. Radcliff, published by King & Co., London, 1874.

climate of Arcachon is not extreme. Less hot in summer than that of countries in the same latitude, it is less cold in winter. This latter difference, very marked on the shore of the *Bassin* in calm weather, may even amount to two or three degrees above the temperature of the forest itself. But when the wind blows, recourse must be had to the shelter of the trees and the protection of the *dunes*. Nevertheless, the prevailing winds, north-west, west, and south-west, are not cold, since they have passed over the immense extent of the ocean in order to reach Arcachon; but they are sometimes violent, and chill by reason of their violence. When they prevail, from December to February, for several consecutive days, they do so continuously, night and day, without interruption; therefore we do not experience in the south-west that phenomenon, so common on the shore of the Mediterranean, of a sudden transition from the temperature of the day to that of the night. . . .

Residence in the heart of the resinous atmosphere of Arcachon is suitable in phthisis of the irritative form, with predominance of the nervous temperament, either primitive or acquired; and is unsuitable when the lymphatic temperament of a torpid form predominates. Whence we get the final and more general formula—*the action of a pine atmosphere is sedative to the nervous system*. . . . Thus, children affected with chronic bronchitis have generally derived benefit from their sojourn at Arcachon. But here, again, it is especially among those who were of a nervous temperament that the quickest and best results have been observed. . . .

But in the management of children affected with chronic bronchitis, and frequently even in the case of adults, Hameau insists on following the example of Buchan, on the discontinuance of the constant wearing of flannel, never to cover the chest with flannel for any length of time, and to withdraw it in the case of those who are in the habit of wearing it. In this latter case it is necessary to take great precautions against the dangers of too sudden a change; the best plan is to replace the flannel waistcoat by an ample and thick over-all woollen garment. That, however, is not enough, but we must aim at freeing the patient, as soon as

possible, from all superfluous weight of clothes. The same day that the flannel is taken off vigorous friction on the body and arms is commenced with a towel soaked in very cold water, giving four or five brisk rubs in every direction. The patient then dries himself immediately with a very dry, but not a warm, towel; dresses quickly, in a thicker suit than usual the first few days, then gradually resumes his ordinary dress, and a healthy reaction soon produces a sensation of comfort. This practice, borrowed from the northern nations, our masters in comfort, not only replaces flannel with great advantage, but is also the best preservative against colds and chills. It is to be desired that it should be domesticated among us, and that it should become as indispensable as the ablutions of ordinary cleanliness. . . . Still less can it be admitted that the vicinity of the sea air goes for anything in the beneficial action of a sojourn in the forest, since it has been so frequently observed that it was only necessary for the invalids who have derived most benefit from their residence in the forest to walk occasionally on the shore in order to endanger the improvement that had taken place. . . .

At the outset of the malady, where there is only a threatening of disease (unless the temperament absolutely requires a residence in the forest or on the shore), the passing from one district to another is advised, avoiding, on the one hand, the violent shore winds, and, on the other, the extreme heat of the forest. . . .

The most favorable countries are precisely those in which, as in the South of Europe, variations of temperature occur every day, without very great extremes, and in which the seasons are clearly defined. . . .

A short walk on the shore has sufficed, in the case of some eminently nervous and impressionable invalids, to bring back accidents which would have been extinguished in the sedative atmosphere of the forest. . . .

At Dr. Hameau's instigation and that of the municipal body, the Compagnie du Midi commenced, in the year 1862, the erection of its elegant winter villas, now forty in number. The spot chosen was in the region of the *dunes*, which are

the warmest sheltered spots in the forest, protected from the force of the wind, and presenting the maximum of resinous emanation, and consequently of sedative action. . . .

In other places pleasures have, it may be, their utility; but here, for natures which must be tranquillised at any price—which must be guarded against every drain on the nervous system—the quiet amusements which will spring up naturally among acquaintances, as the colony of strangers augments, will always be sufficient. . . .

It is because we do not meet with consumption in those numerous families of *resiniers* whose profession is transmitted from father to son from time immemorial, and because they have attributed this remarkable immunity to the resinous air, that physicians have thought of using it as a therapeutic agent. . . .

“The *resiniers* differ much from the other inhabitants. Less intellectual and less active, they are nowise inferior as regards frankness and gentleness of character, and they excel in sobriety. It is principally in physique that the difference is striking; they are small, thin, of a swarthy complexion, and they have a certain appearance which renders them easily distinguishable.” . . .

“The *resiniers* are eminently of a *bilious phlegmatic* temperament. If, in the flower of their age, a predominance of the sanguineous system can be perceived in a few subjects these cases are rare, and are, as it were, only a transient gleam which scarcely forms an exception. Their maladies rarely have an acute character, and when they have they always present themselves under a bilious type,” and . . . they are subject to very few diseases. . . .

“All the facts confirm the sedative influence of the atmosphere of the pines.

Dr. Hameau's final conclusions are—

1. That the climate of Arcachon is sedative to the nervous system.
2. That it places certain consumptives in a medium favorable to the cure of their disease, and always to some degree of amelioration at least, when there is a predominance of the nervous system.

3. That it favours the cure of chronic bronchitis in the same conditions.

4. That it is unsuitable to every disease of the chest in persons of a torpid lymphatic temperament.

5. That it is suitable to most asthmatics."

I may mention that in the middle of the so-called basin of Arcachon nine to ten millions of oysters are yearly produced on the Bird Island—*Isle d' Oiseaux*.

BIARRITZ.

From Arcachon we travelled for five hours in the train through the *Landes*, a flat, sandy country, previously covered by the sea, but now planted with pine forests, which have improved both the sanitary state of the country and the material condition of the previously very poor inhabitants. Since the American civil war, when the importation of turpentine was prevented or diminished, the price of this article, which is to a large extent produced in the *Landes*, has contributed to the improved state of the inhabitants. The majority of the trees are *bled*; that is, a large incision is made and a part of the bark removed, in order to permit the sap to be collected in earthenware jars, which are fixed below the incision. This sap, when concentrated, is the turpentine.

A few miles before Bayonne the vicinity of the Pyrenees changes the character of the country, and this change continues as far as Biarritz, which is mostly built on the cliff facing the Atlantic Ocean.

This place, which a few years since was the habitation of fishermen only, and almost unknown, now presents, to patients as well as to tourists, all that is wanted, either for pleasure, comfort, or for cure.

A mild, invigorating sea, an even climate, a radiant sun, and a splendid shore, unequalled, as the inhabitants believe, in Europe, are to be found at Biarritz, which is at present one of the most frequented watering-places in France. Many English visitors are to be found here at all seasons.

The first visitors arrive at the end of May, and from that time the season begins in all its splendour. According to

the guide of Biarritz, the sky is pure without a cloud, the air mild, the sun warm, and all fruits and flowers appear. In fact all nature is clothed in its summer garments, and decked with fresh and lasting colours.

Biarritz has two seasons, viz. summer and autumn. The first season lasts from May to July, and is specially adapted to those who require special comfort and rest.

From July to the end of October is the season for strangers, tourists, children, and the upper classes. The number of Spanish visitors is very great at this season.

At Biarritz there are three sea-bathing places.

The Porte-Vieux is the resort of the morning bathers. There the sea is calm, protected from the wind, and washed on to a smooth and sandy shore.

The bathing at the Grande-Plage is suited for those lymphatic and strumous children and adults, and all those who require the tonic and invigorating effects of the strong and powerful waves which follow each other in quick succession, and often knock the bather down, even when he is only up to the waist in the water; the sea being quite open on this Grande-Plage, the length, the quickness, and the shock of the waves, cause a very strong reaction.

The bathing hours here are from 6 till 10 to 11 a.m., and from 4 to 6 p.m. It is very often the case that people bathe twice a day, a large number of spectators standing or sitting on the beach, and the groups of bathers, usually concentrated in smaller or larger patches, form a most amusing spectacle, which is often interrupted by the shouts of the bathers as they are knocked down by the waves, and by the merry laughter of the spectators. Before the bathers return to the dressing cabinets they dip their feet in small tubs of water to get rid of the sand, and in the cabinets they can have for a penny a warm foot bath, which contributes, as I know by personal experience, to the comfort of the bather, prevents shivering, and thus assists the reaction of the body. It is desirable to have this warm foot bath introduced in our watering-places. There are also in the hotels and other houses appliances for hydropathic treatment, and the various warm and artificial mineral water baths.

The Casino contains reading- concert- ball- and refreshment-rooms.

Some English families, who like the mildness of the climate and its even temperature, remain at Biarritz during the winter, form quite a community, and return every year at the same time to seek the calm and fresh air of this shore, and pass several winter months without frost or snow.

I must refer those interested in the various beautiful excursions which make a sojourn at Biarritz very agreeable, to the English and French guide-books. I had three addresses of good hotels, viz. *Maison Rouge*, *Grande Hôtel*, and *Hôtel Gardères*, and, to my surprise, found on my arrival that all three are the names of the same house. The family Gardères appear to be very well known in the South of France and the Pyrenees, because, besides the large hotel at Biarritz, another brother has the great *Hôtel de France* at Pau; and a daughter of this Madame Tavern is the proprietress of the *Hôtel de France* at Eaux Bonnes. In my capacity of a London Physician I was very well treated, and can recommend all these houses to those of my colleagues who visit the Pyrenees; but during the season it is desirable to telegraph in time for rooms. The winter prices for the *pensionnaires* at the *Hôtel Gardères* at Biarritz are very reasonable.

After a stay of four days we left, much invigorated, for *Pau*.

PAU.

“This well-known winter residence is on the top of a slope insensibly inclined towards the north, and sharply cut on the south, by a cliff of 150 feet in height, at the foot of which flows the Gave, and presenting at this side the spectacle of a splendid circle of lofty mountains, at a distance of from 20 to 25 miles.” . . .

“According to Sir Alexander Taylor, the order of the frequency and duration of the winds is thus summed up—

“North-west . . .	112 days.	East . . .	31 days.
West . . .	55 „	North-east . . .	24 „
North . . .	52 „	South-east . . .	24 „
South . . .	44 „	South-west . . .	23 „

“The Atlantic currents cause the frequent rain at Pau during 140 days, and about 43 inches annually.” . . .

The hygrometric table of Pau during the decade 1853—64 according to Dr. Ottley.

	Hygrometer.	Rainy days.	Rainfall. Inches.
Winter	81	33	7·3
Spring	75	43	16·9
Summer	72	30	9·0
Autumn	79	34	10·3
Annual	77	140	43·5

“The invalid is irritated at the least wind as a deception, and regards each sunless day as a fatality which must be detrimental to him.” . . .

“The altitude above the sea-level is nearly 700 feet.” . . .

“The climate of Pau is damp in the meteorological sense of the word, but this dampness has not the disadvantages ordinarily dreaded, because the soil is gravelly, very porous, and as the oscillations of temperature are never very great in one day, the condensation of the vapour of atmospheric water need not be dreaded as in the Mediterranean region.” . . .

“According to the physicians who have studied the country, the inhabitants, the Béarnais, have a certain slowness of circulation, and their diseases affect the sub-acute type. Rheumatism, however, is frequent there. Longevity is remarkable in this population. One in 45 of the inhabitants die annually, whereas the mean in France is one in 39. In a period of twenty years (1822—1842) there were—

“Deaths at from 65 to 70 years of age	...	...	347
70 „ 80	„	...	720
80 „ 85	„	...	320
85 „ 90	„	...	161
95 „ 100	„	...	103 ”

Pau has 20,000 inhabitants, is a chief town of a department, and offers to its fluctuating population all the pleasures of large towns. Its inhabitants are warm and hospitable towards strangers, and, being very desirous to retain them by making their residence agreeable, omit nothing that might contribute to their comfort and their amusement. Therefore, the winter colonists there are always numerous, always satisfied.

During the winter of 1867-1868, Dr. Lahillone was struck by the effect caused by some meteorological phenomena on several patients suffering from diseases of the respiratory organs; he had already previously observed that when he was called to one of his tuberculous patients in consequence of an aggravation of the symptoms, he had either on the same or following day to see several more of his tuberculous patients. The symptoms of all were more or less similar, either a return of a catarrh, of a cough, of a slight hæmoptysis, or of some streaks of blood mixed with the expectoration, or some derangements of the digestive organs, or some special symptoms of the nervous system, which have no connection with the pulmonary affection.

All the patients, although in various degrees, appeared to be under the influence of some general atmospheric causes which produced analogous effects.

The patients did not suffer from the prevalent *medical* constitution, but from an *atmospheric* constitution; therefore, the principal meteorological signs, viz. the pressure of the air, the relative moisture, the temperature, the state of the sky, the time and period of rain and fog, &c., have been registered.

Finding that the various numbers of the above named data did not give the desired result, it was finally, and after many previous failures, decided to make use of two graphic lines in order to make the meteorological changes more evident and useful for practical purposes. Dr. Lahillone in one of these lines represents the geometric plan of the daily barometric averages, the other line represents the daily average of the relative humidity. The different curves of these two lines show the equal or unequal state of several days, the length of the various periods during which the variation of the atmospheric changes take place; if these different periods are compared with the coincident changes of the morbid symptoms, most interesting and very useful data for regulating the hygiene of the patients might be collected. My aim is only to call the attention of my colleagues to the excellent idea of Dr. Lahillone, and those who are more interested on this important subject will find the details in his work

on Pau, *Étude de Meteorologie Medicale au point de vue des maladies des voies respiratoires*, Baillière, 1869.

In the same pamphlet the doctor finds fault that the patients do not go to Pau before November and December. The majority remain with their families till the variations of the autumnal seasons aggravate their symptoms, and till they find themselves thus reminded that they must be off. The autumn is usually very agreeable at Pau, and in November there is what is called the summer of *Saint Martin*, preceding the colder season. Patients who arrive after the new year are usually more seriously ill than those who come early.

“*We have left too late*” are sad words often repeated by the patients; one week’s delay has frequently sufficed to aggravate the disease and make it less liable to be relieved by curative means, especially by the climate.

Another mistake is leaving Pau too early, during the first fine days in March and April, although the atmospheric variations are frequent and very irregular; before the first fortnight in May people cannot rely on the weather. The patients going too soon north, are always exposed to meet with the end of the winter, and thus to lose in the course of a few cold days the full benefit obtained during six months of sacrifice and patience.

Others encouraged by the improvement and strength they have gained are anxious to make excursions into the mountains, to the sea-side, or to Spain; these voyages undertaken during the variable spring season, are frequently the cause of a serious return of the scarcely improved illness, or of the loss of the strength just obtained.

All persons suffering from chronic respiratory diseases, as tubercles, bronchitis, pulmonary congestion and inflammation, require, with very few exceptions, to remain in the south during several winters, and afterwards to pass in an intermediate station one or two winters; otherwise there is not much chance of a lasting recovery if they are too soon exposed to a rough and cold winter in the north.

Pau is suitable for patients who want a calming and soothing influence, and it happens frequently that patients

with an irritable temperament, unable to bear another climate, arrive in February, March, and April, and have thus lost the best part of their time.

Finally, patients should be reminded that they visit Pau for the sake of their health, and not merely for their pleasure. Moderate and not fatiguing amusements and distractions are most useful, but dancing, hunting, and other exhausting exercises are not suitable for persons whose mode of life, whose hygiene, and daily exercise, and amusements are to be as strictly attended as any medicinal prescription.

In fine weather it is all right to be in the open air, but there is no excuse for patients accepting an invitation to the theatre or an evening party, especially as the exposure to the much cooler night air is most dangerous to patients suffering from pulmonary diseases.

I hope that Dr. Lahillone will, as he told me, soon publish a short and practical work on the watering places in the Pyrenees; as he has passed, for almost ten years, the summer season in Caunterets, we have reason for expecting much practical information.

THE WATERING PLACES IN THE PYRENEES.

At Pau the railway journey ceases, and Mr. Gardères kindly provided me with a tourist map of the Pyrenees as proposed by himself, and with addresses of the best hotels. After passing in an open carriage through a beautiful country with numerous villas, we passed after two hours the hills near Seignac, where the splendid valley of *Ossau* begins, and the *Pic du Midi* is first seen. This lovely valley extends for 16 kilomètres to Laruns, where the splendid road ascends towards *Eaux Bonnes* and *Eaux Chaudes* in large *zig-zags*. The most beautiful views of the valley d'Ossau and of the high mountains are constantly seen, and add to the charm of the lovely scenery.

With the exception of Bagnères de Bigorre and of Bagnères de Luchon, all the other principal watering places in the Pyrenees are situated in smaller or larger glens or valleys, everywhere surrounded by more or less high mountains, which shelter those places against the cold winds; every-

where the air is mild but still refreshing, and more or less invigorating according to the various heights, which are at—

Eaux Bonnes	...	...	748 mètres = 2244 feet.	In the four larger
Eaux Chaudes	...	...	675 „ = 2025 „	places, viz. Eaux Chau-
Cauterets	...	...	992 „ = 2976 „	des, Cauterets, Bigorre,
St. Sauveur	...	...	770 „ = 2310 „	and Luchon, casinos,
Bareges	...	...	1232 „ = 3696 „	theatres, concerts, con-
Bagnères de Bigorre...	551	„	= 1653 „	tribute to the amuse-
Bagnères de Luchon...	629	„	= 1887 „	ment of the visitors.

These watering places have beautiful walks in the immediate neighbourhood, with very fine views, and all patients who have sufficient strength make excursions either on horseback or in open carriages to the various fine spots in the Pyrenees; they are usually accompanied by experienced guides, who look very picturesque in the Basque dress with the red coat.

EAUX BONNES.

The *Etablissement Thermal* is situated at the top of the principal street, which is steep; in the drinking hall I saw two rows of persons standing one behind the other, and while forming *queue* approaching the principal spring, where two persons were constantly filling the drinking glasses of the patients, who with their glass in hand filed up to the right and left, the majority of them mixing their mineral water with some syrup. The various bottles of syrup with the names of the patients on them were placed on long shelves on both sides near the spring. There are six springs which give about 75,307 litres of mineral water containing principally *sodic* and *calcic sulphur*; 130,000 bottles are yearly exported, and about 8 to 10,000 patients and tourists visit the place yearly; the waters are used for drinking, bathing, and gargling. There is a special room in the *etablissement* for gargling, and at the first moment I did not know what the people were doing when I saw them standing each in a small compartment, and their hind aspect only visible; the gargling process appears here to be in vogue in the various chronic throat complaints, which in the other watering places are treated more by inhalations and pulverisation. Dr. Pidoux, an old practitioner and author of a

well-known work on consumption, and on Eaux Bonnes, is the medical inspector, who very kindly told me that at least 60 per cent. of all the patients at Eaux Bonnes are consumptive, that the rest suffer from chronic pharyngitis, laryngitis, and bronchial catarrh. He told me that the combination of *sodic* and *calcic sulphur* is only to be found there, and to this combination many cures are due. The patients are advised to return for several seasons and to drink at home the waters about the end of December. Although the majority of the patients leave in August, the doctor told me how fine September and even October are in this place. In his medical report for 1873, "Un aperçu sur les cures preventives des maladies de poitrine par les eaux minerales d'Eaux Bonnes," he mentions that chronic diseases can be treated prophylactically, because in many cases it is not impossible to know beforehand to which chronic disease there is a special disposition; hereditary tendency, and the complaints from which a child suffers, more frequently might give a clue for finding out the special disposition. Dr. Pidoux admits the existence of *three* chronic diseases, which cause all the other chronic diseases—scrofulosis, arthritis (including gout and rheumatism), and syphilis are these *elementary* chronic diseases.

Herpetismus, the fourth elementary chronic disease added by Bazin, is for Pidoux only a *transition* disease with innumerable forms. Herpetismus is thus considered the original cause of all internal and external chronic diseases, which degenerate and combine, and with the three fundamental diseases give rise to a host of *mixed* chronic diseases, which finally are the connecting link between the capital chronic diseases and those organic and ultimate diseases, which cause death. By observing other laws of this natural or artificial process of degeneration, fusion, and mixture of diseases, science would arrive to the prevention of chronic disease in infancy and youth, and thus a *new social medicine* could be created, which is the medicine of the species, and the highest branch of therapeutics. I have just alluded to the views of Pidoux (which were admitted twenty years ago by Professor Küss, of Strasbourg, who also sought

the transformation of chronic diseases, especially of syphilis, through hereditary causes), because they are only a modified view of Hahnemann's idea of psora, syphilis, and sycosis, being the causes of chronic diseases. Pidoux does not exclude saline and chlorinated mineral waters in his preventive treatment, but he considers their action less deep, and believes that sulphur-waters, especially the old spring (*vielle source*) of Eaux Bonnes, is more stimulating and more tonic and that its effect is more *intense*. It is his conviction that to this spring belongs the most suitable means for counteracting the effects of arthritic degeneration (degenerescence), and of preventing many pulmonary consumptive diseases; he considers this spring as the most complete, or rather that it contains the maximum of the good qualities of all the sources belonging to the same family.

It is strange that a theory propounded by Hahnemann, and given up by most of his followers, should find, although in another form, an advocate in one of the most eminent physicians at the watering places in the Pyrenees.

The waters of Eaux Bonnes are in their physical and chemical properties very similar to those of Eaux Chaudes, and having collected more notes on the latter, I refer my friends to the next article.

Besides the reading rooms in the large hotels there are a casino, small theatre, beautiful walks and promenades in the immediate neighbourhood of Eaux Bonnes, and excursions in all directions contribute to the amusements of patients and tourists. A number of goats are brought every evening into the village, as many of the Spanish visitors and patients like goats' milk for supper and breakfast. In the large open place, where a good music band plays every afternoon, I saw something like a gymnastic apparatus for a basque game played on Sundays; there is a tub filled with water moving round a horizontal bar fixed by two vertical stands; the player has, while running under the tub, which is about eight or nine feet high, to place a long rod through a hole; if he misses the hole, the contents of the tub procure him an involuntary shower bath, which causes much merriment among the public.

EAUX CHAUDES.

From Eaux Bonnes we made an excursion to Eaux Chaudes, which is about one hour distant; the road leads down towards Laruns, but before coming to this place it branches off into another fine glen (gorge), amongst high mountains, where the village forms one long street as there is scarcely enough space for the houses, which are all let to the visitors. The *Etablissement Thermal* is the most conspicuous building and contains the reservoirs for the mineral waters, the springs for drinking, the swimming and other baths as well as douches. Dr. Lemonnier, who has been here for many years, gave me kindly all the information I wished regarding the principal complaints which are treated here. To these belong the majority of uterine diseases, especially sterility and amenorrhœa, rheumatic complaints after metastasis, various forms of neuralgia, and the effects of mental overwork and over excitement, some kinds of dry eczema. Besides the fine air and some beautiful walks, and the casino, which is not too much frequented, there are no special amusements provided for the patients; and in the negative effects of the absence of amusements, Dr. Lemonnier finds an accessory means in many cures of overworked brains. With regard to the quantity of sulphur the waters of Eaux Chaudes belong to the weakest in the Pyrenees. No consumptive patients are to be sent to this place, where the sun recedes at 3.30 p.m. behind the high mountains.

It is situated nearly on the frontier of France, at an altitude of 680 mètres, and at the extremity of the Valley of Ossau, which forms one of the most picturesque parts in this chain of the Pyrenees. The Eaux Chaudes constitute, from a geological point of view, together with the Eaux Bonnes, to which they are closely related, a family distinct from the other sulphurous sources of central France. In fact, whilst most of these latter flow from the same bed of granite rocks, the springs of Eaux Bonnes do not appear until after having traversed beds of limestone, and the springs of Eaux Chaudes at the point of junction of the limestone with the granite, in a fissure nearly parallel to the bed of the river

of Ossau, from the spring of Rey to that of Clot, whence it happens that in the springs of Eaux Bonnes and Eaux Chaudes the proportion of the lime salts is always greater than in the sulphurous springs, which have their origin solely in the granite rocks.

The *springs* at Eaux Chaudes are divided into warm, temperate, and cold, viz. :

		Ce.	F.
Hot springs	{ 1. Le Clot	36·25	97·25
	{ 2. L'Esquirette (<i>warm</i>) ...	35·	95·
	{ 3. Le Rey	33·5	92·3
Temperate springs	{ 4. L'Esquirette (<i>temperate</i>)	31·50	88·7
	{ 5. Baudot	32·50	90·9
	{ 6. Larressec	24·35	75·83
Cold springs	Minvielle	10·60	51·08

Le Clot is used for baths, douches, and drinking.

Esquirette is the only spring which has a large amount of gas escaping by an intermittent effervescence.

Rey is less used for drinking, but more for baths and douches.

Baudot and *Larressec*, especially the latter, are only used for drinking.

Minvielle is the coldest, and mostly used for drinking.

*Physical Properties, &c.** — At the moment that the Eaux Chaudes gush forth, whatever their temperature may be, they are always perfectly limpid and colourless ; but when seen in a large volume, as in the bathing tubs, especially in the "Piscine," the swimming baths, where the mineral waters are only very slowly renewed, they have a slight bluish tint, which proves, without doubt, the absorption of the surrounding carbonic acid, the partial decomposition of the alkaline silicates, and, finally, the formation of a small quantity of the higher poly-sulphides of sodium.

The three principal springs of, Le Clot	furnish 39,600 litres in 24 hours.
L'Esquirette „	39,600 „ „
Le Rey „	56,160 „ „

The temperature of the waters does not vary except to the extent of one or two degrees.

* From *Étude Physique et Clinique sur les Eaux Chaudes*, par MM. Mialhe et J. Lefort.

It has been noticed that the spring of Minvielle has lost its heat a little since 1866. All the springs of the *Eaux Chaudes* contain much more mineral matter than those of a higher temperature.

Hydrochloric, nitric, and sulphuric acid mixed with these waters, do not give rise to any gaseous action, the odour of these waters becoming only more intense by the evolution of hydric sulphide at the expense of the alkaline sulphides.

With the water of Minvielle there is a slight whitish deposit on adding basic acetate of lead.

With the mineral waters sulphate of copper gives a slight brown precipitate.

Tartar emetic gives a clear yellow colour with the water, but with that of Minvielle the colour is hardly visible.

The sulphurous property of the *Eaux Chaudes* is such, that if some of the water is placed in a bottle, sealed up, and sheltered from the rays of the sun, it is remarked, after a few months, that the odour of hydric sulphide is much stronger than even in the waters themselves.

The quantity of carbonic acid or carbonate contained in these waters is in a direct ratio to their temperature and the amount of mineral matter that they contain (see Table below).

These waters contain also silicate of potassium $3(\text{SiO}_3\text{KO})$, but a *little* of magnesian silicate.

The springs of Baudot and Larressec contain nearly as much chloride of sodium as those of Le Clot, Le Rey, and L'Esququette.

These springs contain many calcic salts, and only traces of magnesia and oxide of iron.

Alumina is found in the waters at all temperatures.

	Temperature. Ce.	Saline Residue. per litre.	Carbonic acid. per litre. at 0° and at 760.
Le Clot	36.23	0.348	2.43
L'Esququette	35.00	0.342	2.43
Le Rey	33.50	0.338	2.05
Baudot	25.50	0.334	1.28
Larressec	24.35	0.328	0.81
Minvielle	10.60	0.270	0.53

Dr. Filhol has analysed the waters of Eaux Chaudes, which contain in a litre—

Sulphide of Sodium	...	...	...	0·0087 grammes.
Carbonate of Sodium	...	...	...	0·0350 "
Sulphate of Calcium	...	...	...	0·1030 "
„ Sodium	...	...	...	0·0420 "
Chloride of Sodium	...	...	...	0·1150 "
Silicate of Calcium	...	...	...	0·0050 "
„ Magnesium	...	...	...	} traces
„ Aluminium	...	...	...
Glairine and Iodine	...	...	...	traces
				0·3087

According to Dr. Lemonier, the following is a list of the percentages of sodic chloride and sodic sulphide at the various springs :

	Sodic Chloride.	Sodic Sulphide.
Le Clot	·097805	·007930
L'Esquirette	·092100	·008086
Le Rey	·120627	·009174
Baudot	·114106	·008397
Larressec	·114106	·008086
Minvielle	·088025	·004043

Messrs. Mialhe and Le Fort's table, showing the proportion of simple bodies of acids and of bases contained in a litre of water of the various springs at Eaux Chaudes.

	Le Clot. Et.	L'Esquir- ette Chaudes.	Le Rey.	Baudot.	Larressec.	Minvielle.	
Sulphur	0·003625	0·003753	0·003565	0·003565	0·003575	0·001607	
Acids. {	Chlorhydric	0·0561	0·0556	0·0555	0·0559	0·0554	0·0339
	Sulphuric	0·0811	0·0807	0·0793	0·0817	0·0776	0·0653
	Silicic	0·0550	0·0546	0·0540	0·0531	0·0526	0·0520
	Carbonic	0·0048	0·0048	0·0040	0·0025	0·0016	0·0010
	Iodhydric	traces	traces	traces	traces	traces	traces
Borique	?	?	?	?	?	?	
Potash	0·0079	0·0071	0·0069	0·0066	0·0061	0·0042	
Soda	0·0922	0·0920	0·0874	0·0881	0·0869	0·0611	
Chalk	0·0284	0·0280	0·0273	0·0267	0·0265	0·0239	
Ammonia and lithia, magnesia and alu- mina, oxide of iron, organic matters	traces	traces	traces	traces	traces	traces	
0·329125 0·326553 0·317965 0·318165 0·310275 0·243009							

Messrs. Mialhe and J. Lefort's quantitative table of salts contained in a litre of the springs of Eaux Chaudes.

	Le Clot.	L'Esquiritte Chaudes.	Le Rey.	Baudot.	Larressec	Minvielle
Sodic sulphide	0·00882	0·00913	0·00868	0·00868	0·00870	0·00391
Calcic	traces	traces	traces	traces	traces	traces
Hydric sulphide	traces	traces	traces	traces	traces	traces
Sodic chloride	0·0899	0·0891	0·0889	0·0895	0·0887	0·0543
Chloride of lithium	traces	traces	traces	traces	traces	traces
Iodide of soda	traces	traces	traces	traces	traces	traces
Carbonate of soda	0·0119	0·0119	0·0097	0·0058	0·0038	0·0024
Sulphate of soda	0·0718	0·0725	0·0715	0·0773	0·0706	0·0053
„ ammonia	traces	traces	traces	traces	traces	traces
„ lime	0·0690	0·0680	0·0663	0·0648	0·0643	0·0580
Borate of soda	?	?	?	?	?	?
Silicate of potash	0·0307	0·0275	0·0267	0·0255	0·0237	0·0163
Silicic acid	0·0322	0·0342	0·0343	0·0342	0·0350	0·0399
Organic matter	traces	traces	traces	traces	traces	traces
Total	0·31432	0·31233	0·30608	0·30578	0·29480	0·18011

1. The springs of Eaux Chaudes have an identical composition and a common origin.

2. The spring of Minvielle, although having the same origin as the others, receives continually soft waters, which reduce its mineralisation and temperature.

3. The hotter the springs, the greater the quantity of mineral matter.

4. They differ according to the part of land from which they rise.

5. Besides sodic sulphide all these waters contain calcic sulphide and sulphuretted hydrogen.

6. The waters of Eaux Chaudes are of the same nature as those of Eaux Bonnes.

7. Their mineralisation and temperature are not always constant; nevertheless, the variation is not much.

The following notes are taken from *Études Cliniques et Physiologiques sur les Eaux Chaudes*, par le Docteur Lemonnier. Paris, 1870.

The physiological and therapeutical action of the waters of Eaux Chaudes is, in some cases, very complex, and appa-

rently so contradictory in others, that it is very difficult, in fact hardly possible to describe it under a general heading.

Whilst they promote the appearance and increase the flow of the menses and the bleeding of piles, in other cases they retard and moderate these flows; they constipate or loosen the bowels, increase or diminish the quantity of urine, produce or diminish perspiration, cause and cure eruptions of the skin, increase or diminish mucous secretion, bring on and relieve coughing, cause sleep or restlessness, relieve pain, and finally increase or diminish the deposit of fat.

This diversity of action depends, it is true, very much upon the constitution of the patient, as well as on the manner of using the water.

The most general and complex effects which are shown in the majority of cases amongst those who reside at Eaux Chaudes, whilst undergoing a more or less protracted treatment, are, increase of appetite, sleep, and a longing for exercise; diminished desire for study and intellectual occupations; leanness rather than stoutness, especially in the beginning; increased stoutness follows a cure or amelioration.

Action on the Skin.—A darker pigmentation of the skin as well as of the nails and hair, and its rubbing off in scales, which makes many patients say that their skin comes off like bran, are very general. The same effect takes place, even on those parts which are not bathed, as the face, neck, shoulders, and hands—parts which are more frequently exposed whilst moist to the action of the air, thus causing a disintegration of sulphuretted hydrogen. The healing powers of the waters are well shown by their quick healing action on ulcers when applied in the form of a poultice; neither the blistering nor cauterising of the skin can be kept up during the use of the bath, because the waters heal the sore surface so soon. Formerly the bather had often to pay very much for a few pieces of *Glairine*; experience has now shown that poultices damped with the water have the same beneficial effect in the cicatrisation of wounds. These poultices are especially beneficial in cases of eczema, having, besides, the advantage of relieving the lancinating pains and

violent itchings. After a few baths the skin becomes more moist, the perspiration more abundant; the patient digests better, feels less the heaviness of the head, but, above all, the feeling of weight on the chest.

How is it that profuse perspiration is arrested and modified by the employment of the same bath? A cure of this kind occurred last season at the baths of le Rey and at the same temperature, 32° C.; the patient was cook to a doctor at Bayonne, who returned for the third time (she had not been seen for the last two years) to lessen her copious and exhausting perspiration. Another patient was a woman attacked with rheumatic nodes on both arms and wandering rheumatic pains, which did not diminish until she perspired freely by the sole use of the waters for the first few days. Later on she took douches, which caused her to perspire more; she was relieved by the sole use of the bath. She had a similar perspiration from the internal use of the waters. Thus, under the influence of the same agent two constitutions reacted physiologically in two opposite directions.

It was mentioned above that the tingling caused by eczema often disappeared during the bath, and under the influence of compresses soaked in the sulphurous water. But a lively pricking of the skin and eruptions, which are not always very easily classified, are often suddenly, and sometimes a few hours later, developed in the same bather.

The case is mentioned of a lady who, in consequence of the bath, got red spots on the back and shoulders similar to measles; half an hour after the third bath these spots diminished, and within a week they disappeared entirely without any other influence on her complaint, which was enlargement of the neck of the uterus. It often happens that persons in good health complain of being stung during the bath, although no marks are to be seen; this does not happen when the water has become desulphurised by exposure to the air during the night, which thus proves that this peculiar action is due to the sulphuretted hydrogen, which possesses the double property of soothing and exciting under certain unknown conditions.

Action on the Mucous Membranes.—The waters have

been used for the nose and pharynx in the form of injections and gargles; as they cause a sensible quickening of the capillary circulation as well as a thick and abundant secretion rich with epithelial débris and give a healthy colour to the tissues. Excoriations of the neck of the uterus cicatrise quickly but are generally accelerated by the application of lunar caustic or tincture of sodine. A case is mentioned where the granulations of the cervix uteri entirely disappeared under the influence of the bath, without pharmaceutical means, after a very long treatment; at the end of ten or twelve days the leucorrhœa nearly entirely ceased, the cervix, previously gorged, diminished in weight and volume, while the uterus ascended and got into its proper position. Similar results are obtained in the treatment of pharyngeal and palpebral affections, the secretions of which are increased, after which a reaction takes place and the cure is complete. The internal use of the waters frequently produces flatulence and gives rise to wind of a sulphury nature. In many cases the liver is acted upon, causing a copious secretion of slaty and bottle-green coloured stools. A large number of people are constipated by the water; in these cases a febrile state is manifested and the fœces of the patient are of a deep brown colour, owing, no doubt, to the formation of a sulphide of iron. Colics and diarrhœa are produced by the use of the waters if exposed to the air only for two or three hours.

When the liver is acted upon by drinking the desulphurised water, *i.e.* solely by its alkaline element, it never produces alkaline cachexia, and the urine does not become alkaline,—it loses its acidity, that's all. Under the same influence acid eructations and acidity of the stomach cease.

These desulphurised waters can be drunk with impunity without either weakening the constitution or impoverishing the blood, even after drinking two or three litres a day; it thus forms a good purgative and liquefies the blood.

The water causes gravel composed of urates in the urine.

The case is mentioned of a merchant from Orthes who had never passed gravel, but who, under the influence of a

quantity of desulphurised water, passed three calculi one centimètre long and 4 mm. broad, which were cut in facets corresponding with each other so exactly as to leave no doubt that they formed one large stone.

Dr. Lemonier experimented on himself by drinking during four successive days, eight tumblers of the water of the source of Clot, and on the fifth day he collected the urine, which amounted to 845 c. centimètres. The urine was strong acid and very little red gravel was deposited on the base of the vessel. The weight of the gravel, which was separated by filtering, was 0.75 gr., that of the urea 13.25 gr. The same experiment was made a week later under the same circumstances and same temperature, with this difference, that the ordinary drinking water was substituted for the eight tumblers of the mineral water; in this second experiment, the weight of the gravel was 0.70 gr., and that of the urea 13.50. The sulphur waters appear to expel and not to accumulate the urates.

Effects on Innervation.—The waters and the climate appear to act rather as a soothing than an exciting effect on the intellectual functions; but on the animal functions they certainly produce a vivifying effect, especially on the digestion, locomotion, sexual power, capillary circulation, on the process of assimilation, dissimilation, the action of the skin and the mucous membranes.

The immediate effect of a bath of 32° or 33° C. produces on the majority of patients suffering actually from pain, a sudden cessation of their pains.

Cases similar to those mentioned by Bordeu have been also observed by Lemonier.

It is the custom of the country to place patients suffering in consequence of a fall or of contusions into the bath, and to leave them there for an hour.

A young Englishman who was violently thrown out of the carriage suffered horribly from pains in the whole body, especially of the left temple and left shoulder; a tolerably copious hæmorrhage through the ear caused a suspicion of a fracture of the base of the skull. The patient was about ten minutes in the bath, began to talk, and scarcely complained

of any pain, and two hours later he continued in his carriage his journey to Pau as if nothing had happened.

Two working men, one of whom fell from a high poplar, and the other who was suddenly crushed by the sudden rolling down of large stones, suffering very much, and shrieking terribly, are placed in the bath; a quarter of an hour later the pains almost entirely disappeared, and they afterwards, without any assistance, returned to their inn.

Numerous cases of neuralgia—for instance, one of a shoemaker of Pau and of a peasant woman from Olerau are named who were placed in the bath at the time of pains, and these disappeared as if by magic.

Toothache is often relieved successfully by using the waters for drinking or gargling. Many such patients are relieved or apparently cured while they are in the bath, and the real cure is obtained by the longer period of rest which is obtained by the use of the bath till the intermission of the pain after twenty-four hours.

Thus, sciatica, lumbar-abdominal-neuralgia, eyebrowache, and temporal neuralgia are relieved and cured. Dr. Lemonier mentions also the case of a young lady who had a scar of a wound caused by the explosion of a percussion cap; she came to use the waters in hopes that the foreign body which was still buried in the middle part of the right thigh would be thrown out. She could absolutely not walk, because the slightest movement caused very sharp pain. After the second bath she began to move the limb slightly without too great a pain, and after twenty baths and douches walked without pain and without support, although the foreign body was not removed. This hypostenic action is not always without reaction if the bath and the douches are too long used. A more or less febrile state follows and the patient is obliged to suspend the treatment, and herein consists the great difference of the pure waters and desulphurised waters. These last having a smaller analgesic effect never produce the febrile reaction; they are absolutely soothing either by the loss or by the modification of the sulphuretted hydrogen, which appears to be the principal agent in the pure waters. The drinking of

these waters causes a sort of drunkenness, and their power of curing "migraine" depends on the special power which makes them a cephalic remedy. The source Minvielle seems to have the most powerful effect in this respect, and it is this which, as was mentioned before, permits the sulphuretted hydrogen mostly to escape, although it contains less sulphur. This kind of drunkenness is more frequent at the bath and at the douche; very sensitive persons feel at the moment they enter the bath room this sensation, which seems to have an effect similar to that produced by anæsthetic substances, and it was necessary to supply better means of ventilation in all the "cabinets" where baths and douches are given, in order to counteract this influence.

The physiological as well as the therapeutical action of the Eaux Chaudes is shown by—

1. The effect on the epidermis and the epithelium of the mucous membrane, which causes greater activity of the capillary, lymphatic, and subjacent blood-vessels, which is manifested by a tendency to suppress mucous and purulent secretions, and to bring on cicatrisation of ulcers and the resolution of chronic stoppages and passive congestions.

2. By an increased action of the liver, which can be modified by the use of desulphurised water.

3. By an anæsthetic power, followed, if the action is prolonged, by a reaction in a contrary direction.

4. By the expulsion from the organism of the superabundant plastic and thermogenic substances, and expulsion which is specially increased by the internal use of the desulphurised waters.

5. By a reconstituent effect due both to climate and the use of the waters.

CAUTERETS.

AFTER having made an interesting excursion to the foot of the Pic du Midi from Eaux Chaudes, and after having spent three days most agreeably in Eaux Bonnes, we continued our route in an open carriage across the mountains. The road over the Col d'Aubisque, 5130 feet high, and over

the Col du Couret, 4350 feet high, is constantly surrounded by an always changing panorama of high mountains. We stopped at Argelez for an hour; this has a fine situation on the slope of the Gez, which is 3300 feet high. Many English tourists stop here for a month in the spring, while the trees are in flower. This place is half an hour distant per rail from Pierrefitte, and within another hour and a half a beautiful mountain road leads to Cauterets, where Dr. Lahillone took us round the Grand Etablissement, which is provided with all the latest improvements, and contains the baths, swimming bath, and douches, inhalation rooms, casino, and museum. Cauterets is about 3000 feet high, in a narrow valley between high mountains. To the east is the high Peyraute, to the south the Péguère. The first covered with forests of fir trees, the latter with fir and beech trees. Between the two the top of the Mouné is seen in the east. To the north-east is the Peyrenère, with its three points covered with pasturage. To the north the range of the Cabaliros is seen. These high mountains shelter the place in all directions, and the air, although mild, is very refreshing, and there is no doubt that the climate contributes very much to the cure of the many thousands of patients who visit the place every year during the season from the 15th of May till the end of September. The place is full of lodging houses, and several grand hotels, of which the Hôtel de France and the Hôtel d'Angleterre are the most frequented.

There are about twenty-six springs and thirteen establishments, which are usually divided into two groups. The one that of Cauterets proper, and the other the group of the *South*. The large Etablissement built of grey marble of the Pyrenees, and specially provided by the springs des Espagnols and de César Nouveau, belongs to the first group, and to the same group belong the ten springs of *des Œufs*, which have a temperature of 55° to 61°, and furnish daily 400,000 litres to the Etablissement des Œufs; further, *Bruzaud*, *Rieumizet*, *Vieux-César*, with 110,000 litres daily, *Pause Vieux*, *Pause Nouveau*, and *Rocher*, with 120,000 litres per day, which contains, besides sulphur, iod and iron.

At a distance of 5400 feet from Cauterets, and much higher, are the springs of *la Raillière*, temperature 39° , *Petit-Saint-Sauveur*, *le Pré*, *Mauhurat*, *les Yeux*, *sources du Bois*, which belong to the second group.

These numerous springs, with a temperature ranging from 39° to 61° , and the various chemical compositions, are, besides the climate, the great remedies to which Cauterets owes its name. The physiological effects of each spring on the healthy body have not yet been sufficiently studied, and consequently their therapeutic effects are of more or less value according to the powers of observation, and the experience of the physicians residing during the season in the place. I have tried to compile in the following notes taken from Dr. Lahillone's *Histoire des Fontaines de Cauterets*, all what I believe is most interesting to the busy practitioner who wishes to have some idea of Cauterets. Those who have time and take interest in the history of the use of mineral waters will be amply repaid for their trouble by reading the interesting book I have just named, which contains the titles of other works on Cauterets.

The Springs of Cauterets.

“The principal mineral ingredient of these waters is sulphuret of sodium; the other elements, chlorates, alkaline and earthy sulphates, silicates, nitrogen, and carbonic acid gases, are held in variable, but always very minute quantities. From the small quantity of mineral matter contained, these hot springs may justly be compared to those of Gastein, Landeck, Ragatz, Plombières, Schlangenbad, Teplitz, &c.” . . .

“Whatever be the compounds of sulphur (and the latest researches of Dr. Garrigon on the chemical composition of the Eaux Bonnes show that these are not yet certain), one is justified in asserting that this element plays but a very secondary part as a product of decomposition in this mineral water. The action it exercises upon the skin or mucous membranes, whether directly or by its compounds, is always weak. Nevertheless, with regard to the reflex actions

resulting from this influence, there is no ground for supposing the former to be in proportion to the latter, on account of its various idiosyncrasies." . . .

"It is known only that sulphur is not changed in the stomach, that in the intestine it is partly changed into sulphuretted hydrogen and alkaline sulphurets, which pass in part into the blood. That which is unchanged is eliminated directly from the body. The alkaline sulphurets which have entered the blood produce sulphuretted hydrogen, or sulphates, or even basic products, which are excreted by the kidneys. The sulphuretted hydrogen is excreted by the skin or by the pulmonary mucous membrane. Besides, it has been proved by experiment that the physiological action of the alkaline sulphurets is identical with that of sulphuretted hydrogen. One sees, therefore, that this gas becomes the most important factor of the compounds of the sulphurous water. It takes oxygen from the blood.

"This gas enters the body in three ways, by the lungs, the intestines, and the skin. It is likewise excreted by these same channels when it has been formed in the body.

. . . "Clinical observation has long recognised the good effects of sulphur upon the abdominal circulation, especially in hæmorrhoids. Hufeland employed sulphur, assisted by mild laxatives, in piles.

"It must not be forgotten, however, that years before the time of this celebrated physician, Bordeu had proved the good effects of the springs of Cauterets in chest complaints when associated with abdominal affections, anticipating by his genius the explanations of contemporary science. 'There are many,' he wrote, 'who complain of their chests, although their troubles are really produced by the action of the abdominal viscera; this is a fact which physicians should bear well in mind.'

"If we consider, besides, the action of sulphuretted hydrogen upon the nervous system, according to the physiological law of physical stimuli, we must allow, as the final result of this action, a diminution of the morbid irritability. This gas affects the heart in two ways, in the first place through the vagus nerve, by its effect upon the respiratory

centres of the spinal cord (the frequency of respiration being diminished); secondly, through the muscular substance of the heart itself (diminished irritability of its tissue), on account of the disoxygenisation of the blood which supplies the spinal ganglia of the heart." . . .

"In fact, observation proves that under the influence of compounds of sulphur, the bile secretion is increased by the waste products resulting from the destruction by the sulphuretted hydrogen of the used blood-corpuscles, which have passed into the vena portæ system. Thus this system acquires a more active circulation, and the morphological changes of the connective-tissue corpuscles are more active and, in some degree, more energetic.

"The action of the sulphuretted hydrogen is shown on the skin and mucous membranes by the hyperæmia, by the papillary turgescence, by the more rapid growth of the epidermic and epithelial elements, by an ultimate sedative influence upon the morbid irritability of the cutaneous and bronchial nerves.

"Hence, these waters are useful in diseases connected with abdominal plethora and metallic poisoning, in chronic pneumonic catarrh, complicated by diseases of the spleen, the liver, and the intestines; in nervous affections where a sedative influence is necessary, in certain affections of the skin and mucous membranes where it is needful to stimulate the growth of the cellular elements and to modify the vitality of the deeper layers." . . .

"The works of the brothers Byasson on the *Mauhourat* spring, those of M. Dupourcau on the amount of sulphur in the various springs and pump-rooms of Caunteret, are the most worthy of attention." . . .

"M. Candellè, in a recent work, has ascertained with much ability the effects which the sulphurous springs produce on certain affections of the cardiac circulation complicating other abdominal or constitutional ailments. He has found that the drinking of the waters of César and La Raillère may produce palpitation of the heart, precordial pains, and the reappearance of abnormal cardiac murmurs in those predisposed to these ailments." . . .

“Candellè has ascertained more precisely this difficult therapeutic point, advising a sulphurous treatment only to anæmic patients.” . . .

“Valentin (*Handbuch d. Allgemeinen u. speciallen Balnéotherapie*) places the hot sulphurous springs of the Pyrenees in a separate group, basing this distinction on the small amount of mineral matter contained, on the soil whence the springs arise, on their high temperature, and on their level above the sea (which may attain nearly 4000 feet). They therefore resemble the hot springs which are called ‘*Indifferent*,’ with which they have many points of similarity from a therapeutic point of view.

“The greater part of the sulphur which is contained in these springs is combined with sodium. The presence of sulphuretted hydrogen is hardly perceptible; and this gas is only found as a product of their decomposition. Besides the sulphur compounds are found chloride of sodium, sulphate and carbonate of sodium, silica, alkaline silicates, and a certain amount of organic matter; carbonic acid is wanting, and its place is taken by a certain quantity of nitrogen. Such is the general composition of these waters.” . . .

“According to Gigot-Suard, *César* and *les Espagnols* are the most sulphurous of the springs.

César, *les Espagnols*, *Mauhourat*, and *les Œufs* are the most alkaline; *Mauhourat* and *les Œufs* contain more chlorides than *César* and *les Espagnols*, and do not differ from each other except that *les Œufs* possesses a larger quantity of chloride of sodium.

La Raillère is unique in possessing silica, a remarkable quantity of sulphate of sodium, and fewer alkaline salts than the other springs.” . . .

According to M. Byasson, the waters of *Mauhourat* are revivifying, slightly exciting, and useful in gravel. Their use is indicated in the various forms of chloro-anæmia connected with gastric and functional disturbances, in dyspepsia connected with gout, gravel, or rheumatism, at certain stages of phthisis, and as a preparation or aid to the sulphur treatment properly so called.” . . .

“The brilliant results from these waters in affections of

the throat and chest, the continually increasing success of those of *Mauhourat* in dyspepsia, have gradually attracted all dyspeptic patients from La Raillère."

"At present, as formerly, one meets a great number of patients who prefer the waters of *La Raillère* to those of *Mauhourat*, and this will probably always be the case as long as the intestinal mucous membrane requires to be gently excited to obtain a directly derivative effect. The *Mauhourat* springs, on the contrary, increase the action of the kidneys."

"When the heart is complicated either with a pulmonary affection, gout or rheumatism, it seems to be more prudent to employ the *Mauhourat* springs.

"*César* and *les Espagnols* have, it is true, a powerful action on the kidneys, but this action is always more lively and disturbing than that of *Mauhourat*, although their waters are easily digested on account of their alkaline properties.

"No one has ever denied the specific action of the *La Raillère* waters upon the mucous membrane of the respiratory passages. Thermal influenzas and hæmoptyses have even been described as due to similar waters, which have been considered as accidental though useful derivations (Pidoux), but this has been denied by other authorities.

"It is certain that sulphurous waters have a powerful influence upon the bronchial epithelium, increasing its activity of growth, and thus augmenting the amount of expectoration. The essential condition in a treatment of mineral waters is a good diagnosis of the disease.

"M. L. Wetzlar, of Aix-la-Chapelle (*Ueber die Heilwirkungen der Aachener Schwefelthermen*, 1862), remarks truly that sulphurous waters, even of the same spring, may be employed in different diseases with equal success. This is due to such diseases proceeding from the same cause. Thus, an interruption of a cutaneous secretion may produce a rheumatic attack, a skin disease, paralysis, or neuralgia; therefore sulphurous springs which re-establish the cutaneous secretion are efficacious in such dissimilar diseases, and we can understand the reason without having

recourse to some theory of diathesis. The causes of disease must therefore be taken into account in understanding the action of these waters, although this must not be always followed as an axiom." . . .

"Wetzlar quotes Kortum (*Die warmen Mineralquellen in Aachen*, 1817), as follows:—'If more water is drunk than is necessary, and thus is rapidly eliminated, it fatigues and weakens the stomach; but if it passes quickly into the urine it seems simply to purify the renal system and tract by filtering the blood. If the water excites too copious a perspiration the patient's energy is diminished; if it purges weakness results without benefit.' Wetzlar advises weak or rheumatic patients to drink water in bed. 'The former physicians of Cauterets often gave the same advice.' . . .

"Gigot-Suard has described the *physiological* and *pathogenetic action* of the external use of the Cauterets' water in an excellent chapter of his *Études Médicales et Scientifiques*, 1866, describing the influence of the water used in baths, douches, inhalations, gargles, and pulverisations. His experience led him to admit that normal temperature of 33° to 35° centigrade (91°—95° F.), of the waters of *César*, *les Espagnols*, and *Pause Nouveau*, have in so far a different primary effect from the waters of other springs, that the pulse quickens instead of slackening speed during the bath. The effect of a bath taken at a suitable temperature, viz. one which gives a feeling of comfort to the patient, and if its duration is proportioned to his sensitiveness and strength, is to calm and strengthen him. The skin becomes agreeably heated, respiration and the circulation are calmed and made slower, the urinary secretion is increased, more blood being sent to the skin, all its glands are induced to secrete. The sleepiness which follows the bath is not at all a sign of weakness, but is due to its sedative influence. A bath of ordinary water sometimes weakens under the same conditions, while baths of these waters always strengthen.

"Wetzlar has found that nervous patients cannot bear a long bath, and that those whose skin is soft and delicate should not remain so long in the water as when the skin is

harsh and dry. Psoriasis and pityriasis are better influenced by sulphurous waters than eczema. A patient with articular swellings, the result of gout or rheumatism, should remain a longer time in the bath than one suffering from neuralgia. The tonic effect of these springs is not limited to the skin, the muscles and nerves are also influenced. Hence the good effects obtained in cases of paralysis and atrophy; some of the latter cases require, according to Wetzlar, a bath of two hours' duration.

“The bath must not be employed in the acute stage of any cutaneous, neuralgic, gouty, or rheumatic affection. The exciting effects of a sulphur bath are considered by Reumont as secondary and due to a certain quantity of sulphuretted hydrogen gas penetrating the skin and mucous membranes by absorption and diffusion. These effects may produce, according to Gigot-Suard, what has been called *la poussée*, from simple itching or pricking more or less severe, and of greater or less extent, to vascular eruptions, pruriginous pustules, boils,” &c. . . .

“It is a fact that a certain quantity of sulphuretted hydrogen, although very minute, hardly a milligramme in 200 litres, is found mixed with much watery vapour in the baths, douch rooms, and in the covered promenades; and that a daily visit of several hours to the drinking rooms and within the walls of these establishments, is not without some influence on the health of the patients.” . . .

“Observation has shown that the effects produced upon country people who pass most of their time at Cauterets in an atmosphere saturated with watery vapour and sulphuretted hydrogen, are more rapid and more energetic than upon patients who only remain just as long as is absolutely necessary for the treatment.” . . .

“It may not be possible to determine the *modus operandi* of the reflex action of these baths, but observation proves that a bath taken at the ordinary temperature of the body, at any one of the chief springs, increases the nutritive changes and activity of the skin, and diminishes the excitability of the heart, as well as muscular and nervous irritability. The springs of *Rocher* and *Rieumiset*, when mixed,

form baths containing very little mineral matter, which are very useful for calming the nervous system when over-excited by the thermal treatment or by disease." . . .

"According to Baumann (die Wilbäder, akrotothermen oder indifferenten Thermen), a bath at a higher temperature than that of the patient raises his temperature in three ways, first, directly, by giving up heat to the body, secondly and thirdly, but indirectly by preventing radiation and watery excretion, and by increasing the internal production of animal heat by an accelerated respiration and circulation." . . .

"Warm baths are also suitable for weak constitutions where the healthy distribution of heat is effected with difficulty, as well as for diseased states which require an additional supply of heat to ensure nutrition, and in which the phenomena of oxydation are languid. Again, as the skin excretes the waste products resulting from muscular action, it will be understood that functional disturbances of the skin will cease under a treatment of warm baths.

"With regard to the nervous system warm baths increase the conducting power of the nerves, while baths at the ordinary temperature regulate this function; hence, the former are suitable for cases of paralysis, and the latter for cases of hyperæsthesia."

Muscular activity is increased, diminished, and regulated according to the various temperatures applied.

The mineral vapour baths will be found useful in some skin diseases, chronic rheumatism, paralysis, Bright's disease, some forms of pharyngeal, laryngeal, and uterine catarrhs.

The half bath and foot bath in constantly changing or flowing water are frequently used with success at Cauterets whenever a derivation is desired from internal organs.

The application of the waters at various temperatures is combined with a mechanical power, under the form of general or local douches, ascending and descending showers, and also applied alternately, first warm and cold, and *vice versâ*.

The effects of ordinary hydrotherapeutics are thus com-

bined and increased by the use of the various springs; all of them have some more or less special influence.

Although the uselessness of gargarisation has been sufficiently demonstrated by Gigot-Suard, and by Krishaber, it is still used, and several "*tours de force*" proceedings have been invented for this purpose and are still used at Caunterets.

Raillère and *César*, used internally, show already in the course of a few days their effects on the mucous membranes of the pharynx and larynx, and Lemonnier advises his patients not to strain themselves by gargarising, as the desired effect can be produced by inhalation or drinking. The regular therapeutic application of sulphurous inhalation and pulverisation has not yet taken place. I may add that the walks in the immediate neighbourhood of Caunterets are beautiful and the views charming; the extent of these views increases with the height of the various walks, and every patient and tourist has opportunities of enjoying the beauties of the scenery in proportion to his powers of walking and ascending the mountains, either on horseback or in light open carriages.

In the whole neighbourhood of Caunterets, extending to Pierrefitte and Luz, the high roads are daily watered twice a day in summer, thus the traveller is not in any way inconvenienced by dust, and the evaporation of the water causes a most agreeable sensation of freshness. A *cantonner*, as the road-makers are here called, is employed for three kilomètres, and is provided with a special hollow shovel with raised edges, which he dips in the tiny rivulets running along one side of the road filled with clear water, and throws the water as he walks slowly across the road. It is to be hoped that instead of this hard human labour they will soon employ elastic pipes, which will enable one man to water a longer extent of road, and with less trouble.

Although I have visited a great part of the Continent, I do not remember to have seen any high road kept so well watered as in this district of the Pyrenees.

We arrived at Luz after a most charming drive of two

hours from Caunterets, and on our route to the extraordinary scenery of the well-known *Cirque de Gavarni* visited St. Sauveur.

ST. SAUVEUR.

This watering place is also known as Luz-St. Sauveur, and in consequence of the Empress Eugenie having been sent here for treatment became more known about fifteen years ago.

It is situated at the southern extremity of the valley of Luz, and at the entrance of the glen (gorge), which ends at the celebrated Cirque of Gavarni, which is one of the most frequented parts of the Central Pyrenees. The village consists of about fifty houses and four large hotels, forming one street on the slope of a high mountain and near a rapid torrent.

Although it is 770 mètres (2310 feet) high, the mildness of the temperature, the usual calm atmosphere, the hygrometric state of the air, make the climate *tonic and calming*, especially suitable for nervous, irritable, and such patients as are exhausted by long suffering.

The springs of the baths (la source des bains) and the etablissement are in the middle of the village. The waters used for drinking, bathing, and douches are limpid, transparent, have an hepatic taste, and have the characteristic smell of rotten eggs. The temperature is 34° C., and a litre contains 22 milligrammes of sulphate of sodium (sulfur de sodium).

A litre contains, according to Tilhot's analysis :

Sulphide of sodium	.	.	.	.	0·0218
Chlorine	„	.	.	.	0·0695
Sulphate of soda	.	.	.	.	0·0400
Silicate of	„	.	.	.	0·0704
„	chalk (calcium)	.	.	.	0·0062
„	magnesia	.	.	.	0·0031
„	alumina	.	.	.	0·0070
Organic matters	.	.	.	.	0·0320
Boric acid and iodine	.	.	.	.	traces
					<hr/> 0·2500

The spring of Honsalade, used more for drinking, is clear and fresh, temp. 21° Centigrade, tastes agreeably, although sulphurous, and contains, according to Filhol, 18 milligrammes of sulphide of sodium. It is easily digested and diuretic. Within three kilomètres are the chalybeate waters of Viscos and Saligos, and a bituminous spring at Viscos.

Dr. Caulet, who has been during the last six years medical inspector, told me that in consequence of the small quantity of mineral water, not more than 200 patients can be placed at the same time under treatment. It is essentially a, or rather *the*, ladies' watering place in the Pyrenees, although *Eaux Chaudes* is also considered as a special watering place for ladies.

Women who do not suffer from uterine diseases feel, after the use of a few baths, pains and spasms of the womb, followed by a watery serous secretion from this organ. Chronic parametritis and perimetritis, which Scanzoni considered incurable, are cured here. In all forms of uterine disease, besides the general bath, douches into the rectum are successfully used. When Dr. Caulet uses local douches in the vagina, he applies a kind of perforated speculum formed of thick silver wire. He believes that this contributes to lessening the irritation of the vaginal mucous membrane by external mechanical means.

The following notes on the physiological effects of the St. Sauveur water on the tactile and thermal sensations of the skin have been extracted from Dr. Caulet's interesting pamphlet, the title of which is *Etudes analytiques sur la cure de Saint Sauveur*, Paris, Baillièrè, 1878. It is my agreeable duty to thank Dr. Caulet herewith both for the kind information and the pamphlet he has given me.

Physiological Effects of the Waters of St. Sauveur.

“*Tactile sensations of the skin felt during the bath.*— It is a well-known fact that, among the various sulphurous springs of the Pyrenees, the water of St. Sauveur is particularly striking, owing to its peculiar softness and agreeable

unctuosity—properties which are not special to this place, being found more or less in the neighbouring waters; here, however, they are developed to such a degree that they virtually constitute a distinct character of the place, a fact which is corroborated by all observers visiting the Pyrenees.”

“Although the origin and causes of this unctuousity is not thoroughly known, that of St. Sauveur is attributed to the presence of salts having an alkaline reaction, such as sulphide of sodium, alkaline silicates, &c., as well as to a great quantity of organic matter in solution.”

“The patients experience the following sensations, an agreeable oiliness and softness which causes everything to be soapy, oily, velvety, frothy, and mucilaginous.”

“The intensity of the sensation is very variable, and considerable differences are observed with regard to this effect among the bathers.”

“In some the oily and soapy sensation is so well marked that a sort of disagreeable sensation, somewhat distressing, is felt on various parts of the body, especially on the palmar aspect of the hands and fingers, and on the soles of the feet—impressions more readily felt when these parts come in contact with some other part of the skin. Others, when they have taken a certain number of baths, experiencing nothing disagreeable in the treatment, appreciate the oiliness. Finally, there are those who experience nothing during the whole time of treatment.”

“There are some who appreciate very much the soft or hard qualities of ordinary water, either in a bath or otherwise, yet who experience in the warm water of St. Sauveur no other tactile sensation than that of an ordinary hot soft-water bath, not even when washing their hands alternately with mineral and ordinary waters. But these are exceptions. The greater number of the bathers more or less experience the sensations that we have mentioned, and every year numbers of patients, chiefly ‘neuropathic’ women, are to be seen returning to the place in order to enjoy, so they say, the special action of the mineral water on the skin, and the effects which they attribute to it.”

“Persons who were most sensibly affected by the unctuous characters of St. Sauveur water, often presented marked alterations of tactile sensibility (anæsthesia), and painful sensibility (hyperæsthesia); many times there were some patients who did feel the unctuousness, but, nevertheless, had cutaneous sensibility quite intact, though examined in the various ways.”

“But observation shows that at St. Sauveur among the so-called nervous and various primary neuropathic cases, as well as among chronic cases of every nature complicated with the nervous element, there exists a pretty nearly constant relation between the intermediate curative effects of the hot treatment, and the perception of the unctuousness in the bath by the patient.

“This relation is more remarkable among those endowed with that variety of skin of which the delicacy, whiteness, and lustre can be compared with satin; it is this skin which forms one of the most beautiful features of woman.”

“Very often under these circumstances patients quickly perceive the unctuous sensation, and through it experience a feeling of well-being, enjoyment, and pleasure.

“Local pains adventitious or allied to visceral affections (of uterus, bladder, &c.), as well as those neuropathic miseries known under the name of ‘vapeurs,’ ‘restlessness,’ setting on edge of the nerves, &c., have been seen to diminish considerably, and disappear from the first days of the treatment. The habitual feelings of weariness and of painful lassitude (pseudo-paralytic weakness), are to chronic disease what ‘*oppressio virium*’ is to acute disease, but still they are of a truly nervous constitution; for instance, chronic neuralgia, pains in the stomach, the return of convulsive attacks, &c. Nevertheless, during the five years that Dr. Caulet has studied the effects of St. Sauveur he has not noticed a single cure (in nervous diseases) among those patients who did not feel the unctuous impression.”

“It is a constant and well-known fact that, all things being equal, those who do not experience the unctuous sensation in the bath undergo the cure less well. Those in

whom cutaneous sensation is refractory to this impression of the mineral waters, are not at all improved."

"At St. Sauveur, where the source of the baths is used directly on the spot, and at its natural temperature, the water shows the same composition as the waters of the César, which is the hottest and richest in sulphur at Cauteret, viz. 23 milligr. of sulphide of sodium per litre, *i. e.* 6.30 grammes for a bath of 300 litres."

Cutaneous thermic sensations.—"The principal spring of the baths upon which the reputation of St. Sauveur is based, has a temperature of 34.5° C., is collected in two little reservoirs, whence it is distributed to the contiguous bath-rooms; the water preserves at the same time its heat and sulphurous properties. Thus, the average temperature of the baths varies from 34.2° C. to 32.8° C. from the room nearest to and the room furthest away from the source. It is in this last that the warmth is called temperate: this circumstance is necessary to be remembered in order to refute the opinion which praises the mildness of the action, and the soothing virtues of the cure when these mineral waters are at a low temperature. *Frigus sedat nervos*, without doubt. This axiom would be applicable to those patients who find the bath of St. Sauveur cool, but these are exceptions, as the majority of the patients feel the bath at 32° either tepid or decidedly warm.

"With a temperature varying from 34° to 33° the baths appear cool or temperate to some, indifferent to many, and decidedly agreeable and even warm to the greater number (especially women).

"Those patients who find the bath at 34° cool, would find an ordinary bath too hot or even insupportable at the same temperature, and would not take any except at 30° or 32° C.

"Those who find the bath at the first instant of immersion either agreeable or fresh feel the warmth increases by degrees, and the water is finally felt very warm; at the same time the skin reddens, the breathing quickens, the pulse becomes frequent and full, the countenance is animated, and the forehead is sometimes covered with perspira-

tion. These effects last more or less, but generally do not wear off in the longest bath; the patient comes out in full reaction, preserving a feeling of strength and energy for the rest of the day.

Others, on the contrary, who find the water warm on entering, believe after a short time that the temperature is rapidly subsiding; they feel gradually overcome by the cold, and, after various disagreeable sensations, end by shivering. Although they may add fresh warm water, rub themselves, and move about, they do not regain their natural warmth. The state of horripilation lasts as long as they remain in the bath, and have a kind of malaise for the rest of the day. Even to these patients the treatment may do good, but it can easily become injurious if not well directed. If the patient leaves the bath before feeling the shiverings, *i. e.* before the first symptoms of cold are manifested, a good reaction nearly always follows, and a feeling of well-being lasts all day. With these precautions the treatment is well borne and does good. If, on the contrary, the patient stops in the bath too long, in spite of the chill, it is found that the cure becomes difficult and injurious (*frigus nervis inimicum*), and the sensations of uneasiness and chill succeeding such a bath have a most injurious effect in nervous diseases. In the course of five years Dr. Caulet has seen only four patients with this predisposition to chills and shivering; these were obliged to give up the treatment and had to resort to the source of Honsalade, which has only 22°, is specially used internally, but also applied in another etablissement under form of douches and baths, for which other purpose it is artificially warmed, has a special action on the *utero-ovarian* system, and cures the catarrh, inflammation, and neuralgia of these organs, the ailments of puberty and *menopausia* (climacteric years), bad consequences after childbirth, sterility, disposition to *fausse couche*, chronic and various forms of metritis, peri-uterine phlegmonia, ovaritis, chronic dysmenorrhœa, the various forms of spasmodic and hyperæsthetic hysteria, facial and intercostal neuralgia, and the various conditions known as irresistible, impressionable, and nervous constitu-

tions, chronic, muscular, and articular rheumatism ; in cases of erethic phthisis, which cannot bear the waters of Eaux Bonnes and Caunterets, gastralgia, with prevalence of dyspeptic symptoms, and especially with flatulence ; in catarrhal affections of the bladder when dependent on chronic inflammation of this organ St. Sauveur was also useful.

BARÈGES.

FROM LUZ and St. Sauveur a very fine new road leads to the renowned bath of Barèges, which is 3696 feet above the level of the sea ; during the whole distance of eight kilomètres, the road is constantly ascending. A short distance before Barèges are the sulphur thermes of Bargun (temperature 31.2° C.), which are used internally, as well as externally for baths and douches, by patients whose nervous system is more irritable, and who require a more soothing influence.

Barèges consists of one long street on the Save (river) of Bastan, between two high mountains—the Ayré on the south, and the Labar Blancs on the north. In winter all the houses are buried by twelve to fifteen feet of snow, and the whole population emigrates, as in some other watering places in the Pyrenees.

The temperature of the eight springs varies from 31° to 45° C. ; they belong to the most exciting springs of the Pyrenees, and supply about 260,000 litres of mineral water in twenty-four hours. Dr. Vergers, the principal consulting physician, has been here for more than twenty-five years, is also professeur agrégé at Toulon, and a man of much experience. He told me that he is still learning every year more about the use and application of the waters, which are most beneficial, according to his experience, in chronic syphilis, in strumous and scrofulous diseases, in gout and rheumatism, especially in *rheumatism nodosum*, and in several forms of *eczema*. Dr. Vergers has also mentioned the difference of the development of the

facial bones, especially of the lower jaw, in many patients suffering from curvature. I have for many years been struck by the difference of the outlines of both sides of the face and the unequal development of the lower jaw, and have often pointed out to my patients and their friends the difference of the two halves of the face. At present I have a scoliotic patient, a girl of eleven years, under my care, whose greater development of the lower jaw is very marked, but has never been observed by the parents. Last year I had a similar case, where one half of the face had a convex outline, while the other was almost straight. I do not remember to have read any observations on this unequal development of the face, and I beg to call the attention of my colleagues to this abnormal development of the face. Many years ago I attributed the convex outline of the lower part of the face to the constant oblique position of the head which is so frequent in scoliotics; but now I attribute it in many cases to an unequal development of the bones, especially in rhachitic and strumous constitutions.

As chronic diseases of the joints are frequently *relieved* or *cured* by the waters of Barèges, I have extracted and translated the following notes from Dr. Le Bret's pamphlet:—

*On the Treatment of Joint Diseases by the Waters of
Barèges.*

The employment of sulphurous waters in the treatment of joint-diseases, viz. white swellings and congestive conditions of joints, has been long known. Nevertheless, the latest works on surgery and medicine omit this therapeutic agent in giving the preference to irritants, electricity, compression, antiphlogistics, or complete rest, according to the different stages of the disease. Bonnet, of Lyons, wrote, "Experience shows without doubt the great superiority of the treatment of joint affections by sulphurous springs as compared to home treatment." . . .

The chemical analysis of the Barèges springs shows that

they belong to the class of sodic sulphurous waters. Their temperatures vary from 29° to 44° C. (85° to 110° F.)

The waters, in the form of the simple bath, the plunge, the weak but hot douche (110° F.), and as drinking water, comprise the therapeutic elements which are employed. Chronic arthritis, especially tumor albus, form the largest percentage of the cases treated at Barèges. All varieties of the degenerations may, however, be met with in diseases of the joints, which may be easily understood when we remember the different tissues which constitute a joint. Even in Boyer's time it was believed, as now, that rheumatic and scrofulous diathesis was the most common cause of white swellings. In many patients, in the absence of scrofula, strictly speaking, an exaggerated lymphatic temperament predominates; external violence, a fall, contusion, a sudden stretching, sometimes exposure to damp cold, have been sufficient to develop the disease. . . .

Chronic disease of the knee is one of the complaints most frequently treated at Barèges. Among 30 patients, 15 were adults from thirty to fifty years of age, a few adolescents, and only 3 children. These patients did not exhibit a scrofulous diathesis. . . .

The exciting and persistent influence of rheumatism in causing many joint-diseases is not to be gainsaid. . . .

Blennorrhagia and the consequences of the puerperal state are only credited with four cases.

Amongst 32 cases, 14 had lasted only a year, 8 for two years, 6 from three to five years, 3 for four or five months. A single patient had a chronic affection which had lasted six years. As the rheumatic element was a chief cause in the etiology of the joint-diseases which come for treatment to Barèges, it will be understood that those cases in which the disease attacks the soft parts of the knee are especially suitable for treatment.

Usually there is a true arthritis, characterised by swelling, stiffness, impossibility of extending or flexing the joint beyond a certain amount, most frequently without pain or signs of degeneration of the bones or ligaments in the interior of the joint. Muscular atrophy, weakness of the

lower extremity, added to a difficulty in walking, complete the picture. In 5 cases hydrarthrosis was present, the intracapsular effusion having set in with the arthritis. . . .

The duration of the bath never exceeds an hour, whether in the large tank or in the private bath. The douche is applied for fifteen minutes; the temperature and the amount of mineral matter contained in the douche (the latter being sufficient to remove 3 per cent. of the oxygen in the atmosphere of the room), demand more attention from a therapeutic point of view than the force with which the douche is applied. The water of the Tambour spring, given in doses of from two to four glasses daily, combines effective internal treatment with that of the bath and douche.

Barèges boasts of an eminently therapeutic water, constant in its mineral constituents, whose influence experience has proved. Accessory conditions, such as height above the sea-level, a bracing atmosphere, or other auxiliary influences, are found here as in its rivals in the Pyrenees.

In a treatment of knee-joint disease, on an average thirty baths and twenty douches are required; still in some idiosyncrasies the indolent nature of the disease has required as many as sixty baths and forty douches. Sometimes the nature of the disease and the general state of the patient has obliged the discontinuance of the douche, and the employment only of the bath and the drinking of the waters.

It is, however, only in the first stage of chronic arthritis that Barèges treatment is of use, namely, where the tumor albus is limited to cartilaginous lesions, serous effusions, and to functional derangements; but where there is caries, necrosis, or osteitis, or if there is bony ankylosis, no effect can be expected. In forty-one cases of knee affection treated at Barèges, twenty-two were improved, thirteen cured, four unsuccessful, one aggravated, and one death, due to the stimulating effect of the treatment.

Improvement is usually shown by the gradual diminution of the swelling, if present, and by the resolution indicated by the congestion of the periarticular tissues; the

bony prominences become more visible as in the healthy state, and the knee recovers its lost form; the movements of extension, and especially of flexion, are gradually affected, and walking becomes practicable again in different degrees according to the individual case; in all, however, exercise increases the power daily.

Two affections left by arthritis resist this treatment; one is the dry crackling well known to sufferers from chronic rheumatism, which is due to the degeneration of the cartilages and to an insufficient quantity of synovia; the other is the atrophy involving either all the muscles of the corresponding limb or the extensor muscles. Happily, these consequences of arthritis and prolonged loss of power lessen under the influence of exercise.

A cure is rarely effected during the course, or by the close of a first therapeutic course. It is impossible to fix how soon after the Barèges treatment the amelioration produced by it will end in a complete resolution of the affection. . . . All the health resorts where chronic diseases find appropriate remedies become, in some degree, meeting places for their visitors for many successive summers, and Barèges proves the success of its treatment in this way also. Cases are known where the application of the waters are not suitable, and which are shown in local disorders, or in symptoms of advanced *cachexia* which oblige patients to refrain from both baths and douches. Dr. le Bret mentions the case of a swollen knee-joint of one year's standing in a young patient. There was no change in the colour of the skin or any phenomena of actual inflammation; fourteen baths were given from a temperate spring and five douches, which caused congestion, pain in the knee, with febrile and other symptoms. . . . Dr. le Bret has shown the bad influence of sulphurous springs on certain ulcers, which become coated with false diphtheritic membranes or become gangrenous. . . . Surgeons recognise a form of coxalgia in children, where the diagnosis reveals only a pain produced by pressure at the level of joint, showing itself by the exaggerations of certain actions in conjunction with a bad position of the limb. In those well-

marked cases where a lymphatic and scrofulous state is present the sulphurous treatment, combined with the mountain air, is crowned with success. It must be understood that in acute rheumatism it is necessary to forbid the use of the Barèges waters. Nevertheless, exceptional cases are to be found where patients coming to the sulphurous springs immediately after an attack of acute rheumatism go away cured without further attacks. Dr. le Bret quotes the case of a young man, who for two months was a prey to attacks of rheumatism in the joints. When he came to Barèges he had œdematous swelling round the ankles, internal pain on pressure, and was unable to walk. The constitution appeared much debilitated. A score of baths and some gentle douches removed all his symptoms. No accident occurred to counteract the good effect, and a year after he was in robust health. Dr. le Bret also describes another form of joint disease, which is neither gout nor rheumatism, to which he gives the name of "rheumatisme noueux" (rheumatoid arthritis). When the nodosities do not show much degeneration of the affected parts, and if the patient is still young and of good constitution, he has no doubt that Barèges treatment checks this disease, usually thought almost incurable. . . . Dr. le Bret intends to prove that sulphurous springs have a powerful action on the different stages of scrofulous osteitis. . . . The curative effects of sulphurous waters in general, and those of Barèges in particular, in chronic arthritis are well known; the use of them is especially indicated when rheumatism, a lymphatic temperament, and a scrofulous diathesis are united in producing tumor albus, and when the soft and bony tissues are not too degenerated. The douche, whose force and temperature are invariable, should be administered with care. Its topical effects, with regard to the strong reaction they provoke, may sometimes surpass their object, awaken sharp pains, and give rise to new inflammatory symptoms, either in the synovial membrane or in the bony tissues of the extremities. A double property characterises the results obtained from the treatment of arthritis by these waters, viz. first, resolute local action favouring the absorption of

plastic deposits, which thicken the tissues and impede the play of the joint; secondly, restoration of the general health, to which the height of this mountainous region contributes.

The improper, too-long-continued use of the sulphur waters causes the *thermal fever*. As soon as the first signs of this are observed the patient's treatment must be interrupted, and calming bath of bran, barley, milk, &c., are used.

Baregine,

also called glairine, sulfurose, pyrénéine, luchonin, &c., is an amorpho-gelatinous substance, sometimes whitish and transparent, or blackish and opaque, agreeable to the touch; it is found as a deposit of many sulphur waters, and used for curative purposes, especially in affections of the skin when the epidermis and deeper layers of the skin are split, ragged, and even in ulcers of the skin.

*The effects of Barèges in Paralysis preceded by Dry Colic.**

Dr. Armien's attention has been directed to many cases of consecutive paralysis and dry colics, I give the result of his experiences on the treatment of the complaint.

M. Bassigny, in 1881, after landing at Couron, in Guiana, a swampy plain on the sea shore, was attacked by violent colic pains, as a sequence after a chill caused by dampness and living near the river; he suffered from obstinate constipation and green-coloured vomiting; he thought he had been poisoned, and suffered most excruciating pain in the back and extremities. He was treated with hot baths, cataplasms on the stomach, and by purgatives. The attack lasted a fortnight, without relief or sleep; the patient was in a nervous state of excitement, which was only relieved by

* The following notes are extracted and translated from Dr. Armien's pamphlet, published in 1864.

the bath. Finally he was able to pass some motions, and soon was cured. Lavements with tobacco leaves seemed to calm the nerves, but for two days it produced some wandering. At the end of a year some attacks of colic intervened, and during the intervals attacks of diarrhœa and intermittent fever. On returning to Cayenne, during a crisis of colic and vomiting, he was attacked with cerebral symptoms with coma, loss of memory, facial paralysis, and loss of power and sensation in the arms and legs, but without convulsions.

The colics returned every two or three weeks, and lasted four or five days; the pain in the joints increased, renewed attacks of coma, followed by paralysis of the extensors of the upper and lower extremities. The colics continued to increase.

On his arrival and entrance to the hospital at Bordeaux he was attacked with dry colic and bilious vomiting; the pains in the limbs increased; tepid baths, cataplasms on the abdomen, were tried without effect; purgatives were vomited without any aperient effect. In 1863 he arrived at Barèges; after forty baths and twenty douches, he returned to America in a very satisfactory condition, the paralysis and nodosity of the joints having in a great way disappeared.

A creole, without being ill, never addicted to drink to excess, was attacked only whilst on land and in marshy districts after frequent chills. The attacks were renewed at long intervals and under varying hygienic conditions; finally, cerebral symptoms, identical to those produced by drink, intervened to complicate the disease, and were followed by partial paralysis of the extremities, with nodosity of the joints; all these complaints were rapidly ameliorated by the use of the waters of Barèges.

In 1862 there was a case of a sailor, æt. 25, coming from Mexico on sick leave, with enlargement of the spleen; he had had dry colic for a year, with slight palsy of the forearm. The colic, with obstinate constipation and cramps, came on only five months after his landing in Mexico, whilst in camp in the environs of Vera Cruz. Intermittent fever

came on soon after. It seems that this dry colic is only met with on land under different hygienic conditions, by badly-defined telluric and atmospheric conditions, amongst which marshy miasmas and a high temperature play a great part.

In our temperate climate, during the hot season, we often see violent colics produced by the cold night air on the uncovered body. These attacks are purely nervous; there are no stools, but sharp abdominal pains, vomitings, and cramps.

The Madrid colic seems to be caused by the sudden cooling of the body whilst hot and perspiring; this is caused in warm climates through carelessness.

M. Coste noticed that this intestinal neuralgia came on suddenly, presented never the symptoms of lead poisoning, though followed by palsy of the limbs. A certain relation has been observed between gout and lead colic; the pains and the articular enlargements in these two diseases were allied by the fact, that there was an excess of uric acid; the same effect being seen in Devonshire colic, the difference between lead and dry colic being that in the latter case the symptoms come on suddenly, whilst in the other they are produced more slowly; also, when people engaged as house painters, or in lead mining, &c., leave off their dangerous employment, they are more liable to chills and other influences, which prepare and bring on an attack of dry colic.

A case is mentioned of general paralysis following dry colic, contracted two years before in Cochin China, by working with minium and white lead, which in the hospital of Toulon was relieved by sulphur bath and *Aconite*; the patient's right arm was atrophied, the right hand weak, flexion of fingers incomplete, touch obtuse; lower extremities emaciated; hyperaesthesia of the skin on the right side; flexion of the left foot incomplete; this foot swells slightly in the evening; right foot can scarcely be moved. This patient has been very considerably improved after thirty-six baths and twelve douches, and a complete cure is reasonably expected.

Similar observations are given where Barèges had a good effect.

I have no doubt that the mountain air contributes very much to the constitutional improvement. Except excursions and nice walks, very little is done in Barèges for the amusement of the patients. The military hospital contains several hundred beds, and many wounded, suffering from the painful after-effects of the wounds contracted in battle and under very unfavorable circumstances, have found here not only relief, but have been restored to perfect health. Many of my colleagues will find the use of the so-called Barèges baths very efficacious in many chronic diseases even in their *private practice*, as I have lately myself experienced in a case of what is usually called chronic rheumatic arthritis; fingers, hands, wrists, ankle-joints, and insteps have been swollen and enlarged for seven months. A professional man in large practice and generally considered successful, had in *vain*, during seven months, tried to cure the child about three and a half years old. After my visit to the Pyrenees and what I had seen there, I prescribed every other day a sulphur bath, with half a drachm of *Sulphate of Potassium*, for fifteen to twenty minutes. After the first six baths the child had considerably improved, all the swellings diminished; incapability of passing urine intervened, and was relieved by tincture of cantharides in very small doses. The sulphur baths have been continued, and when I saw the child the last time she walked and ran about, made use of the fingers and hand, although the enlargement of the various parts had not yet entirely subsided.

BAGNÈRES DE BIGORRE.

After our visit to Barèges we returned to the railway station at Pierrefitte, because the drivers asked exorbitant prices for transporting us across the mountains; travellers, especially English, should never agree to pay more than the usual terms, which certainly vary sometimes according to the larger number of tourists. After an hour's travel by rail we

had to stop for three hours at *Lourdes*, which during the last ten or fifteen years has been resorted to by a large number of pilgrims from all parts of France, and also from Spain, in order to visit the cave where the shepherd boy thought he saw the Virgin; this apparition was the cause of a large church being built over the cave, of several convents being erected in its neighbourhood, of some nice walks being laid out in its vicinity, and of a double line of huts and shops a mile long erected, where nothing but candles, rosaries, and large and small statues of the Lourdes virgin are sold by thousands; the candles are offerings to the church and cave, like the sacrifices in olden times, while the rosaries, pictures, and statuettes serve as souvenirs of the pilgrimage.

The church is full of votive offerings, framed inscriptions in needlework, expressing thanks to the virgin for favours granted, for misfortunes prevented, for diseases cured, and health restored; there was one large inscription in white marble where a daughter expresses thanks for the instantaneous and miraculous cure of her mother, who was struck with paralysis caused by disease of the spinal cord; there are numerous similar inscriptions which tell how the legion of ignorant believers in the miraculous resort to Lourdes in the vain hope of being instantaneously cured. To see an instantaneous cure of paralysis caused by disease of the spine was unhappily not my lot, but I did see a great number of blind, lame, and deformed, who, notwithstanding a longer stay at Lourdes, still retained their infirm condition.

My companion could not make out how people could persevere in their belief of the wonderful cures when they saw the number of invalids of all kinds loitering about. I could only answer, in the words of the great poet, "Even the gods fight in vain against stupidity and prejudice."

To me, personally, the aspect of the pilgrims, of whom the majority were women, led by their priest, the number of invalids, and the shops with their contents, caused a most painful sensation, as I stood wondering that such a scene should take place in the so-called enlightened nineteenth century, and in a civilised country like France.

After another hour's drive through the town and suburbs, which are very pleasantly situated in a plain surrounded by hills, we continued our journey by rail, and arrived safely at Bigorre, where the Hôtel de Paris, recommended by Mr. Garderes, offered us all the comforts we required.

The following notes are taken from a pamphlet by Dr. A. Cascua, a young physician, who had the advantage of obtaining his principal data from Dr. Dejeane, a well-known practitioner at Bigorre, whom I herewith thank for having been so kind as to accompany me to the various springs and establishments, and to give me the results of his experience.

Bigorre, with her 10,000 inhabitants and 1650 feet above the sea-level, is sheltered by the surrounding hills from all winds except the north, which is not very cold in winter, but which in summer contributes to the diminution of heat in the valley, as the town is situated between the plain of Tarbes and the charming valley of Campan, well known by its marble quarries.

According to the observations of Ganderax, made in July, August, and September, the average of the temperature in summer is from 14° to 16° C., while the maximum does not exceed 27° ; the south-east wind is the most frequent, and the sudden variations of the temperature are here much less frequent than in the other watering-places of the Pyrenees.

Sailaignac, an author of the last century, mentions that the fame of Bigorre is traced to mythological times, and that Mars, wounded at the siege of Troy, was the first to be cured by these waters, which Apollo had detected. In olden times the Basques inhabited the country, and when the Gauls were conquered by the Romans these latter frequently resorted to these waters, known as the *vicus acquensis*; traces of Roman roads and inscriptions on the medals of Augustus, Trajan, and Marcus Aurelius, serve to prove that these roads were well known to the Romans; the Vandals, Visigoths, Moors, and Normans, followed each other in the possession of this country, and after the treaty of Bretigny for sixty years it belonged to England.

The first known medical treatise, *Du bon usage des Eaux de Bagnères*, by La Guthère, was published in 1659 at Toulouse, and I find not less than twenty-six titles of medical works which have been published up to 1875.

There are more than fifty springs, which are divided in sulphuric-, iron-, and saline-arsenical; but the most celebrated, and to which most marvellous cures are ascribed, are those to which the name of "Salut" has been deservedly applied. The "Etablissement de Salut" is situated about 3000 feet from the town at the foot of the mountain Garros; a beautiful road lined with large trees, in a charming little valley, leads to it. Omnibuses and carriages bring the weaker patients to the bath, while those who can walk the short distance may do so by a lovely pathway through the small forest. As Dr. Cascua has made use of the works of Ganderax, Pambrun, and Alban de la Garde, many of the following notes are due to these authors.

Physical Properties of the Salut Waters.

I. La Source de la *Montagne* has a flow of water equal to about 144,000 litres in twenty-four hours; its temperature is 33 C. or 92 Fahr.

II. La Source de *l'Intérieur* furnishes 180,000 litres in twenty-four hours, and its temperature is 32° C. or 90.5° Fahr. The water drunk in the pump-room placed at the entrance, as well as that of the ascending douche at the foot of the central staircase, is obtained from this spring.

III. La Source de la *Pompe* gives 784,000 litres every twenty-four hours. The temperature is 89° Fahr.

The water from these springs is pure and limpid; it is unctuous to the touch, and softens the skin; it does not mark paper or linen. A few minutes after the bath a feeling of suppleness is felt through the whole body. The taste of the Salut waters is slightly insipid, a little bitter, and, in spite of its lukewarm temperature, never nauseous. Its digestibility and lightness are such that many glasses can be drunk in succession without unpleasantness. Its

specific gravity is the same as that of distilled water. On entering the bath one feels a slight sensation of freshness, which almost immediately gives way to an inexplicable feeling of comfort. During the bath numerous globules of gas arise, form into clusters, and at the least movement disappear on the surface of the water.

The water in the bath is incessantly removed; it is an important advantage for the bather to be in this continual mineral current.

Chemical properties.—In 1869 Dr. Alban de la Garde analysed the Salut water. The following table is due to him :

Nitrogen, Carbonic Acid, and Oxygen Gases.

Chloride of magnesi ⁿ m }	0.215 grammes
„ sodium }	
Sulphate of calcium	1.670 „
„ magnesium	0.495 „
„ sodium	0.033 „
Bicarbonate of calcium	0.107 „
„ magnesium	0.070 „
„ iron	0.010 „
Arsenate of sodium	0.007 „
Phosphates of calcium and of alumen	0.007 „
Silicate of calcium	0.055 „
Lithium	} Traces.
Manganese	
Copper	
Fluoride of calcium	} 0.068 „
Organic matters	
Total	2.757 grammes.

The water contains a small quantity of arsenic, and the Bagnères waters have a slight alkaline reaction.

The Salut water has the remarkable peculiarity that, at the end of certain hot summers, it becomes sulphurous, giving off the odour peculiar to sulphurous springs, and bronzing a silver coin in eight or ten minutes, while for the rest of the year it is alkaline and without smell.

Physiological properties.—At the moment of immersion

the bather feels a slight instantaneous sensation of freshness, followed by a feeling of great comfort, which lasts as long as the bath. "In the bath the pulse generally becomes large and full, and is hardly accelerated." On leaving the bath a sharp sensation of cold is felt, immediately, however, followed by reaction, which restores the state of bodily comfort felt in the bath. The bather is inclined for exercise, the limbs feel more supple, and his appetite returns. "Agitated sleep, a feeling of excitement, fulness of blood, at other times lassitude, tingling sensations in the limbs, a difficulty in keeping quiet in bed, and sleeplessness, are often witnesses to the modifying effect of the mineral water on the nervous system. Soon these symptoms disappear, and the sedative and strengthening action shows itself. In most individuals this sedative effect is obtained by the first bath. Sleep becomes calmer and deep, the nervous trembling of the hands lessens and disappears, the pains are not so severe, and the frequency of the various crises diminishes. The recurrence of menstruation is often hastened, and the stools are more copious and frequent."

Effects of the use of the Salut water taken internally.—The water, with its slight taste, is taken without disgust, and very easily digested. A short time after taking it one feels hungry, and digestion is more easy. It aids the secretions of the intestines, the liver, and pancreas, and quickens the abdominal circulation; the stools become more abundant, less solid, more frequent, and of various colours, thus showing intestinal hyperæmia.

The experiments of M. Lemonnier on himself prove that the Salut waters, taken in small quantities, are slightly diuretic; but this action, noticed by Secondat as early as 1750, is much more appreciable, and becomes considerable when large quantities of this easily-digested water are taken. Then the urine becomes abundant, often containing an excess of urates. According to Dr. de la Garde, "on an average a third more urine is passed than water drunk."

To sum up, the Salut waters act chiefly as sedatives to the nervous system, increase and regulate the circulation,

increase the activity of the secretions of the skin and alimentary canal, consequently improve the appetite and digestion, and are strongly diuretic.

Therapeutic properties.—These waters have a modifying action in herpetic affections by an alterative action on their predisposing morbid or diathetic causes. According to Ferrand, the “specific remedy (arsenic) does not act by directly attacking the essential cause of the disease, or by neutralising the specific morbid agent. Thus, 5—10 milligrammes of arsenic daily are useful in febrile affections, as in tubercular patients, in improving digestion by its sedative influence on the excited circulation. Arsenic acts also as a sedative of the circulation when it is functionally disturbed, without any febrile condition, and increases the appetite by stimulating the stomach.”

The other ingredients in the Salut waters tend to produce results similar to those attributed above to arsenic. It contains indeed iron, according to Gubler, “un récorporant et un tonique analeptique par excellence.” It also contains alkaline chlorides, which stimulate oxidation (Rabuteau) and increase the number of the red blood-corpuscles (Plonviev), and alkaline carbonates, which liberate free carbonic acid and gently stimulate the mucous membrane of the stomach. Finally, there are sulphates, which promote an intestinal hypersecretion, according to Rabuteau, and help to eliminate a certain quantity of water and of organic crystalloid waste matters.

(1.) The tepid thermal baths may be prolonged beyond an ordinary bath.

(2.) At equal temperatures the thermal water is more agreeable and soft to the touch than ordinary water.

(3.) Thermal water heals sores resulting from wounds, burns, &c., more rapidly than ordinary water; and

(4.) Cures diseases refractory under ordinary baths.

The Salut baths have, like the ordinary warm baths, a sedative action on the pulse and nervous system, remove physical and intellectual fatigue, promote an agreeable feeling of warmth and well-being, which, beginning at the skin, soon pervades the whole body. They relax the skin and

muscles, increase the patient's sensitiveness to atmospheric variations, and promote sleep. They alleviate pain and diminish inflammation in a large number of cases of phlegmasia and other affections. They cleanse the skin of much filth, the product of sweat, dust, and fatty matters, soften it and maintain its suppleness and elasticity, and help to render it more capable of fulfilling its various functions of absorption, transpiration, secretion, excretion, sensation, &c.

The Salut baths differ, however, from ordinary baths in some points, such as the amount of calm produced on the nervous system, in the tonic effect, &c. Thus the action of the arsenic, of the alkaline chlorides and carbonates, of the sulphates, and of the bath in general, are sufficient to explain the increased appetite and improved digestion which follow the use of the waters. But it appears impossible to explain how these waters cure those cases of severe hemi-crania, of obstinate dyspepsia, and of various nervous diseases which have resisted all other treatment, both therapeutic and hydropathic, and which improve rapidly by the internal or external employment of the Salut water.

Salut waters have a favorable action in many diseases as unlike as they are numerous, viz. in cases of neurosis, dyspepsia, migraine, and in diseases of the central nervous system. The following observations are taken from Dr. Dejeane's notes, and published by Dr. Casca.

CASE.—Mr. C—, of Vendôme, 1875. Patient's life has always been very regular. The mucous membrane of the alimentary canal and the skin were chiefly affected. The slightest irritation applied to the skin caused an eruption mostly of an eczematous character. Mr. C— suffered also from an aphthous affection causing irritation in the throat, with dry cough in the morning, followed by the expectoration of a small pellet of muco-albuminoid matter. Appetite very varying. His food was limited exclusively to roast meat, eggs, fish, and wine. Vegetables apparently overtaxed the stomach; in fact, digestion was always very difficult, with flatulence and discomfort of the abdomen; meals were usually followed by one or two liquid stools, accompanied

with much flatus. If the bowels were confined spontaneously or by any medicine, great heaviness of the head was immediately felt, with giddiness, general malaise, and lumbago. These various symptoms having resisted all ordinary treatment, the patient was sent to Bigorre.

Treatment.—Salut baths, two glasses of Salut water daily, and douches taken at the hot springs were prescribed, with the result that the patient left much improved.

CASE.—Mr. R. F—, aged 38, July, 1875. Ill two years. His liver had been enlarged, but is now of normal size. The patient suffers from occasional pain in the stomach, accompanied by much accumulation of flatulence; no tumour present. Therapeutic agents with hydropathic treatment gave some relief, but the pain was very obstinate, and digestion very bad. Vichy waters were tried last year without benefit. It was a case of dyspepsia and gastralgia.

Treatment.—Salut baths, drinking the waters, and warm douches were prescribed; the patient left much improved, almost cured.

CASE.—Mr. D—, suffered from vertigo, due to some lesion of the stomach. He digests badly, without appetite; complains very much of his head and giddiness; his legs sometimes fail, causing him to fall; he feels sick at the same time, but does not lose consciousness.

Treatment.—Salut baths and drinking the waters effected a complete cure.

CASE.—Mr. P—, of Bordeaux, aged 40, July, 1875. Had suffered for ten years from chronic gastritis, induced by overwork, with cramps in the legs sufficient to prevent sleep; for the last two years attacks of very severe gastralgia, vomiting necessitating a diet of cold milk, white meats, and fish.

Present state.—Stout, florid, no history of alcoholic distress. No appetite, never feels inclined to eat. Constipated, with very dry evacuations. The tongue a little coated at the top; digestion long and painful. Stomach distended, painless cramps, sometimes severe headaches.

Treatment.—Baths and drinks of Salut water, with

thermal douches. After a few days the douches felt too warm to the patient, so they were omitted. Mr. P— left much improved, sickness quite gone.

These cases show that dyspepsia accompanied by vomiting was not only improved but cured by the Salut waters. Cases in which dyspepsia is accompanied by a diseased condition of the uterus, and where migraine is of very old standing and unaffected by ordinary therapeutic agents, are suitable for treatment at Bigorre, with the probability of much relief, if not of a perfect cure.

CASE.—Madame de S—, July, 1875. Nervo-lymphatic temperament; enjoys tolerable health, but is not strong. Some fifteen months ago menstruation was delayed, accompanied by gastric troubles. She might almost be considered pregnant. This lasted about two and a half months, when she was seized with pains analogous to those of parturition, followed by a serious attack of hæmorrhage, which continued with much pain for several days. After some months the menses were again missed for three periods successively; pregnancy was again suspected; an attack of hæmorrhage similar to the last followed, even more copious and longer continued.

By the internal and external use of the Salut waters the patient was perfectly cured. Some time afterwards Madame de S— became *enceinte*, and was delivered at full term of a healthy child.

Characteristic symptoms of hysteria are successfully treated by a stay at Bigorre.

Attacks of hysteria, more or less severe or simulating more or less perfectly cases of paralysis, are often most discouraging, both to patient and physician, and are generally obstinate under every sort of treatment; yet the Salut waters often exert a calming effect as gratifying as unexpected, although, if wrongly administered, harm instead of good may result.

Treatment by Salut waters is contra-indicated in cases of articular rheumatism. Dr. Dejeane was the first to point out this fact, confirmed by Dr. Cascua from his own personal experience, having suffered from an attack of severe general

articular rheumatism a few years ago. He had occasion recently to try some experiments with the Salut waters, and took a few baths, about 11 a.m. daily, at the beginning of September. Obscure pains appearing, however, in the joints, he was obliged to give up the baths, the pains almost at once ceasing.

In all the cases above quoted the length of treatment was from 20—25 days.

Indications for the use of Salut.—An over-excited condition of the nervous system is the most prominent symptom in those cases which have been successfully treated, where there has probably been more or less congestion of the nervous centres. Dyspepsia, especially so-called nervous dyspepsia, where the nervous trouble directly affects digestion by a harmful influence upon the circulation of the digestive organs, are suitable for treatment by *Salut*, especially if the urine is not overloaded with urates, and if no gouty diathesis be present. These cases of uric diathesis should be sent rather to Vichy, though the latter is not suitable for some cases of gout or disease of the liver, where one of the following complications is present:—Cardiac disease, dropsy, organic disease (cancer, tubercle, &c.), Bright's disease, anæmia, &c.; these are far more suitable for *Salut* treatment. Even a gouty patient without any complication will find more relief here if the nervous element predominate in the case.

Migraine.—Where there is not only pain but disturbance of the facial circulation, and at times nausea or vomiting is curable by the Salut waters, where the disease is due solely to an over-excited condition of the nervous system, so that this treatment is recommended in all cases of migraine preceded or accompanied by intense nervous disturbance.

Neurotic diseases.—The treatment of all cases where there is severe nervous excitability and erethismus is usually successful. So also in uterine disease accompanied by much nervous disturbance sufficiently severe to prevent satisfactory treatment by ordinary remedies. In diseases of the uterus the difference in the effects of St. Sauveur and Salut is

that the St. Sauveur sulphur waters are most successful in chronic uterine affections, helping also to calm the nervous system. The difference of action is as follows:—Both are sedative, and act beneficially on the local condition, but St. Sauveur effects this by acting directly on the uterus, while Salut acts by its directly sedative effect on the excited condition of the nervous system, and only secondarily on the uterine disease, caused by the state of the nervous centres. Therefore, Salut treatment is to be preferred where the nervous trouble is the primary one. In many cases the best results are obtained by treating uterine affections, first by Salut waters, and when the nervous excitability has been calmed, to proceed to the employment of the waters of St. Sauveur.

Salut given carefully may be very useful in cases of phthisis with more or less severe erethismus, especially during attacks of nervous excitability. The same is the case with cardiac disease with excessive nervous irritability, and of anæmia under similar conditions. The various other waters at Bagnères de Bigorre, having the same chemical properties as the Sault waters, give analogous results, although experience has proved that none can rival the latter in its characteristic efficacious and energetic effects.

The only other watering place in Europe which can be compared to Bagnères de Bigorre according to Dr. Constantin James is that of Pfeffers, a dreary place compared to the pleasant and smiling landscapes of the former, with its social advantages and amusements, so helpful to the hypochondriacal patient.

Contra-indications for treatment by Salut.—Cases of acute articular rheumatism, with its sequelæ, are not suitable for treatment by the Salut springs; this may be partly due to the comparatively low temperature of the water, although the Foulon spring at Bagnères, which is hardly a degree higher in temperature, and has almost the same chemical constitution, effects the most surprising results in cases of articular rheumatism. It is, however, found that even in articular rheumatism Salut, taken inter-

nally and combined with Foulon baths, give very good results, especially if any dyspepsia is present.

Pulmonary disease, and especially phthisis, are not suitable for this treatment; the chief objection is the low temperature of the water, but such cases may be benefited by drinking the latter, especially if nervous excitement is present.

According to M. de la Garde pregnant women should avoid the Salut baths.

The uric diathesis, uterine diseases, and anæmia, are all contra-indications for the employment of the Salut, except where there is much nervous irritation, and then only internally.

Adjuvants to Treatment by Salut Waters.

The different springs of Bagnères may be divided into three groups, sulphurous, chalybeate, and saline chalybeate, as all diseases accompanied by much nervous excitement are acted upon beneficially, but this condition of the nervous system is often accompanied by complications which may be much relieved by the employment of the other springs of Bagnères, as the sulphurous waters of *Labassère* in torpid pulmonary affections; the chalybeate waters in anæmia, which is so frequent. Dr. Dejeane recommends the chalybeate waters a few days after the Salut treatment has been followed by the effect of calming the nervous erethismus. He also employs the astringent *Salies* waters as an injection in cases of leucorrhœa where other symptoms indicate Salut. The saline *Lasserre* waters are useful in constipation. The principal aid to treatment is also hydropathy, to which the remarkable effects of the Salut waters are sometimes attributed. When the waters are taken internally the effects must be watched, especially in cases of dyspepsia. Meals ought to be substantial and nutritious, and at regular hours. Dr. Lemonnier advises abstinence from dry vegetables, peas, haricot beans, lentils, cabbage, heavy pastry, cheese, preserved butter, &c.

BAGNÈRES DE LUCHON.

All those who are not pressed for time should drive from Bigorre to Luchon, across the mountains, because the road is one of the nicest in that part of the Pyrenees, and leads across the Col d'Aspine through a splendid forest of old fir trees. After leaving the forest, at a height of 4500 feet, the view opens on a most beautiful panorama of the surrounding high chain of mountains, amongst which the Pic du Midi is the highest, and where, during the last few seasons, an old general makes highly interesting meteorological observations. After leaving the Col d'Aspine we had excellent views in our descent of 2500 feet in the valley of Arreau and passed the night in the town of Arreau. The next morning we continued our journey across the Col of Peyresourde, which is 150 feet higher than the Col d'Aspine, and after a drive of four hours we arrived at midday at Luchon, where the Hôtel des Bains has been justly highly recommended.

Luchon, 1887 feet above the level of the sea, in the most eastern corner of the valley of the same name, is the chief place of the canton, has 4000 inhabitants, and consists of the old and new towns. The old is built immediately at the foot of the high mountains, which shelter the place during the winter months; the new town contains the majority of the hotels, lodging-houses, and is built more for the visitors, tourists, and patients, of whom many thousands resort to this celebrated and very pretty watering place, which has one of the largest établissements, with a front of 300 feet and depth of 150 feet. The great entrance hall is decorated with nice frescoes; the baths are in communication with a subterranean gallery excavated in the rock, which is 3000 feet long, 7 feet high, and about 5 feet wide. In this gallery, where many cryptogams are growing, the mineral waters are collected for the supply of the baths, which are used here in *all* forms as general and local baths, swimming-baths, all kinds of douches, vapour; the bathing

rooms are of a smaller or larger size, some provided with awnings, others with ventilators, in order to enable the patient to inhale more or less of the sulphur vapours according to the special direction of the physician. A committee of physicians has been consulted before this etablissement was built, and therefore it contains many special contrivances which are wanted in other watering-places. For the convenience both of patients and their medical men, there are consulting rooms in the etablissement, where at certain days and hours the patients, before entering the baths, can have medical advice.

Of the fifty-four springs at Luchon forty-eight are sulphurous, and form the best known series of graduated and modified sulphur springs, varying in temperature, in the quantity of sulphur they contain, as well as in their combination. The forty-eight springs of sulphuretted sodium have a temperature varying from 30° Centigrade (d'Etigny nro. 2) to 66° (Bayen); their sulphuration, or quantity of sulphur they contain, varies from 0·0064 of sulphur of sodium in a litre (Richard, inférieure, nro. 1) to 0·0786 (in Bayen), and 0·0915 (in Bosquet). 600,000 litres of sulphur water, and about 900,000 of the cold saline water, constitute the daily supply; notwithstanding this large supply, the patients are obliged, at their arrival, to go to the Etablissement and ask for a number. According to this number they are admitted to the various baths; the price of the bath varies according to the season and to the hours chosen. All French poor, the patients of the Luchon Hospital, all military men, many civilian officers, all foreign and French medical men, are exempt from paying for the use of the waters. It is my duty to thank Dr. Ferras for the information he gave me while showing me the etablissement, and Dr. Dulac, one of the senior physicians, for his communication regarding the diseases in which the waters are principally useful. Scrofulous, rheumatic, arthritic, syphilitic affections, are the principal classes of disease suitable for Luchon; but very much depends upon the *right* use of the waters, which an intelligent medical man can only learn by observation, experience, and individualisation of each patient.

It happens frequently here, as well as in other sulphurous baths, that the patients are over-excited through the injurious use of the mineral waters, and suffer from thermal fever; therefore, those who send patients to the Pyrenees should advise them to carry out strictly the instructions of the practitioners under whose care they place themselves.

The climate is mild, and in summer the north wind cools the great heat. It is not advisable for patients to go to Luchon before the end of May. July and August are considered the best months for those who use the baths. Those who wish to know more about these waters I must refer to the works of Drs. Fonsan, Filhol, and Lambron, Gourraud. Dr. Dulac will probably soon publish the results of his large experience during many years' practice in Luchon.

The following nine springs are used, either alone or in various combinations, at the établissement :—La Reine, 51; La Grotte, 48; La Blanche, 36; Richard, 43; Pré, 45; Bordeu, 69; Bosquet, 44; Ferras, 33; and Etigny, 36. The numbers show the temperature in Centigrades. Although all these waters are *limpid* and clear at the spring, some of them change when collected in the reservoirs; they are cloudy and appear whitish, as if mixed with milk. This is due to a change of the sulphur, which, from its dissolved state, is deposited in the form of a kind of powder. The odour of sulphur is remarked in all but Pré, Bayen, Bordeu, and smell more intensely. *At present* it is believed that the *sulphurate of sulphur of sodium* is the *sulphuric* combination which gives to Luchon its characteristic qualities.

Bordeu and Bosquet are considered soothing and sedative; used in lymphatic, scrofulous, and nervous affections.

Richard, supérieure and inférieure, are specially used in rheumatic and skin diseases.

Blanche is prescribed to nervous persons.

Grotte, supérieure and inférieure, are slightly exciting.

Reine is a strong stimulant.

Ferras.—Both springs are used in gastralgia.

Pré.—The internal use prescribed for lymphatic and scrofulous persons.

The établissement is open in winter; and, besides the four

large classes of diseases named before, the following are frequently relieved or cured in Luchon :—Asthma, several pulmonary chronic affections, catarrh, enlargement of abdominal organs, crusta lactea, suppressed menstruation, painful scars, anchylosis, exostosis, rheumatic nodosities.

Herpes and its various forms are, according to Durand-Farrel, successfully treated by the waters which contain the sulphate of sodium ; all the herpetic *skin* diseases, as chronic eczema with intolerable itching, also when complicated with psoriasis guttata, pityriasis, psoriasis, papular herpes, prurigo and lichen, chronic urticaria, pemphigus, and exfoliating herpetic affections, are frequently relieved and cured ; but the various springs must be carefully chosen, not only according to the state of the disease, but also according to the susceptibility of the patient.

Herpetic affections of the mucous membranes, especially the angina granulosa, affecting larynx and pharynx, or one of these organs, and other throat complaints, are frequently treated by the *douche pulverisée* and by the internal use of the springs of *Pré*. In the beginning of the treatment the irritation is increased, and when there is swelling of the vocal cords the voice gets still more hoarse, the bronchial secretions are increased, and although the bronchorrhœa might be very copious, the sputa are less thick, contain more air, and are easily expectorated, and have frequently a greenish hue.

Chronic inflammation of the external meatus auditorius is often caused by herpes, and Dr. Fonsan considers it a pathognomonic symptom of a herpetic diathesis ; the mucous membrane does not suppurate, as in scrofula, but is rather dry, and exfoliates like pityriasis. The tympanum is also frequently diseased, and deafness is either temporary or permanent if the tympanum is perforated ; chronic coryza is also a frequent symptom, which causes hypertrophy of the mucous membrane of the Eustachian tube. Besides the general treatment the sulphur waters are used locally under the form of pulverisation, of vapour, and of injections in the Eustachian tube.

In herpetic chronic *blepharitis* the waters of the spring

Dr. Filhol's Chemical Analysis of the Principal Springs of Bagnères de Luchon.

Name of Springs.	Sulphate of Sodium.	Sulphate of Iron.	Sulphate of Manganese.	Chloride of Sodium.	Sulphate of Potash.	Sulphate of Soda.	Sulphate of Lime.	Silicate of Soda.	Silicate of Lime.	Silicate of Magnesia.	Silicate of Alum.	Carbonate of Soda.	Silica, Prec.	Organic Matter.	Total.
Reine . . .	0.0508	0.0022	0.0028	0.0624	0.0092	0.0312	0.0312	traces	0.0102	0.0048	0.0255	traces	0.0209		0.2511
Bayen . . .	0.0777	traces	traces	0.0829	traces	traces	0.0220	"	0.0220	traces	traces	"	0.0446		0.2270
Azemar . . .	0.0480	0.0022	0.0024	0.0620	0.0072	0.0465	0.0432	0.0058	0.0432	0.0147	0.0237	"	0.0076		0.2811
Richard, sup. . .	0.0595	0.0028	0.0018	0.0659	0.0088	0.0101	0.0400	traces	"	traces	0.0292	"	0.0328		0.2557
Grotte, sup. . .	0.0314	0.0027	0.0013	0.0723	0.0059	0.0682	"	0.0094	0.0376	0.0057	0.0109	"	0.0103		0.2559
Blanche . . .	0.0338	0.0011	traces	0.0500	0.0038	0.0160	traces	traces	0.0769	0.0067	0.0101	"	0.0105		0.2529
Ferras, sup. . .	0.0053	0.0009	"	0.0100	0.0109	0.0580	0.0212	"	0.0506	traces	traces	"	0.0397		0.2002
Borden, nro. 1 . . .	0.0690	0.0003	"	0.0858	traces	traces	traces	0.0233	0.0162	0.0025	0.0073	"	0.0262		0.2306
Grotte, inf. . .	0.0589	0.0021	"	0.0736	0.0113	0.0265	0.0200	traces	traces	traces	0.0141	"	0.0499		0.2546

Quantities not given.

Romains are used for lotions, and also under the form of pulverised douches.

Another herpetic affection, chronic ozæna, usually accompanied by the most disagreeable fœtor, by which both the patients and the persons near them suffer, is often cured in Luchon, if the ulcers are not too deep, and have not perforated the septum; in these cases the strongest, the most exciting, and the warmest sulphur waters are used as injections into the nasal cavities, which must be well bathed and washed in all directions. A cure is almost certain if there is only hypertrophy of the nasal mucous membrane, and the ulcers are but superficial, although the secretion might be very abundant. Sometimes an unexpected cure takes place when the deep ulcers cicatrise.

If dyspepsia is caused by herpetic diathesis it is very painful, and resists the usual treatment. This kind of dyspepsia is cured by the sulphur waters, while in all other forms of stomach diseases, in gastritis, gastralgia, dyspepsia, &c., sulphur waters are not only useless, but very injurious.

Herpetic complaints of the mucous membranes of the urethra, vagina, and uterus, are also relieved and cured by sulphur waters. Previous or coexistent herpetic affections of the skin will guide the medical man in making his diagnosis regarding, the nature of the various affections of the mucous membranes, and whenever a herpetic diathesis is present the sulphur water will prove most useful.

Gout and its concomitant effects on the joints, under the form of swelling, congestion, inflammation, nodosities, incomplete ankylosis, and on the skin, certain varieties of intertrigo, prurigo, pemphigus, cirrhosis, mentagra, and eczema, which Bazin ascribes to an arthritic diathesis, are treated more frequently merely by the external use of the sulphur waters, because the stomach of gouty patients does not digest sulphur waters. Alkaline remedies are used internally, and carbonate of soda is also often added to the sulphur bath. The aim of the treatment is to change the chronic arthritic affections into acute ones, and therefore those springs which contain the maximum of the alkaline sulphides

and hyposulphides are used, besides the vapour bath and the pulverised douches, while Vichy and Vals waters are given during the meals.

Although scrofulous and lymphatic patients are very frequently advised to use saline waters, they bear very well the treatment by sulphur waters, the full bath, douches, hot or cold, applied alternately; the most exciting waters, containing the largest amount of sulphur, are used externally, while they drink Reine, Grotte, and Pré nro. 1. The more serious cases are obliged to return to Luchon during several seasons. Strumous inflammations of the joints are often cured, and ankylosis would frequently have been prevented by an earlier visit. All scrofulous complaints of the osseous system—as osteitis, periostitis, osteomyelitis—as well as of the chronic inflammation of the mucous membranes of the nose, pharynx, and conjunctiva, find a remedy in the numerous springs of Luchon.

A great number of syphilitic patients who have taken too large a quantity of mercury are cured by the sulphur waters, while these aggravate usually all syphilitic symptoms if no mercury has been taken; very large doses of mercury can be taken without causing salivation or derangement of the stomach as long as the patient uses the waters. Dr. Gourraud mentions that he has seen the scars of patients who, after the recent healing of infecting chancres, have used five or ten baths, first to swell, then to inflame; afterwards a very slight superficial and extended ulcer formed in the epithelial strata, with a copious but not thick suppuration. The patients are usually much alarmed, and anxious to apply local remedies, because they fear the reappearance of the old chancre. Every local remedy except rice powder must be avoided, and within ten or fifteen days, during which the suppuration lasts, a considerable improvement is observed; the scar is much softer and smaller, although a slight induration is still felt; this is by degrees absorbed, and finally disappears entirely. The treatment varies according to circumstances, as patients are visiting the baths for the purpose of curing existing syphilitic symptoms, or only for the sake of passing a test cure, whether

they are really cured; herpetic, arthritic, or scrofulous patients infected with syphilis *must* also be treated according to the various symptoms and combinations. According to Dr. Gourraud—

1. The waters of Luchon are no specifics against syphilis.

2. They assist the action of mercury promote the absorption and elimination of this medicine, and prevent its bad effects.

3. When used alone they increase the syphilitic symptoms, especially of the skin; they are most useful in bringing out latent syphilis, but never cure the complaint.

4. They assist in forming a better diagnosis, and in distinguishing the syphilides from the herpetic, arthritic, and scrofulous symptoms.

5. They cure the bad effects of mercurial poisoning.

6. A perfect cure can be ascertained.

7. One course of treatment may be sufficient for a cure, but this is not to be considered as a perfect one, as long as a second course, and merely of sulphur treatment, has not caused any reappearance of previous syphilitic symptoms.

These remarks also prove that working men poisoned by lead or mercury will be most benefited by the waters.

For chronic diarrhœa, especially when combined with gonorrhœic rheumatism, in suppressed gonorrhœa, the waters are used externally as baths, vapour baths, injections, and also internally; in *acute* gonorrhœa the waters are injurious; wounds, painful scars, ulcers, abscesses and fistulas, chronic rheumatic enlargements, and osseous nodosities, in which Barèges is so successfully used, are also treated at Luchon, where the melancholic and hypochondriac patients have more opportunities for distraction and amusement.

The obstructions caused by phlebitis and lymphangitis, the impediment caused in veins by thrombus, as well as various forms of rheumatic affections, are relieved.

Lately, the number of consumptive patients, and of those suffering from chronic bronchitis and chronic pleurisy, who visit Luchon, has also considerably increased, as well as

those who suffer from various neuralgic and other pains, and from paralytic and paretic affections; the various uterine diseases are also numerously represented at Luchon. Dr. A. Fonsan (in his *Recherches sur les Eaux Minérales des Pyrenees*) describes the history and cure of a *hypertrophied uterus with deep ulcerations*, which has lasted *four years*.

This case is very remarkable, because during four years the very enlarged uterus could not be even replaced; the full history is also copied in Dr. Gourrand's interesting book, *Le traitement thermal à Bagnères de Luchon*. Gynæcological and laryngoscopic specialists, at present so lavish with their caustics, may learn that cures can be performed without these caustics.

The principal iron springs of Luchon are Cassel-Vieil Salles, Baringnas, Trebon, and Chat, contain sulphate of iron, and some of them also *crenate* of iron; they are used in anæmia, chlorosis, and whenever *aglobulia* is present from any cause, and assist the effect of sulphur water in lymphatic complaints; although they do not contain carbonic acid, they are still digested, and increase the appetite.

Chat contains the largest amount of mineral substance, but as this spring is at some distance it is not so much used. The iron waters are usually drunk at meals, for which purpose daily a fresh supply of bottles, filled in the morning, is sent to the hotels. When it can be managed it is better for the patient to walk to the iron springs, and thus the walk will assist in the digestion of the iron waters. Lately a new iron spring, called Sourronis, has been found, which contains also arsenic, which will be an additional remedy in herpetic diseases, and general weakness.

The whey cure belongs also to the adjuvants of Luchon, but the whey is made only of cow's milk, although in other places it is made of goat's milk; whey is used in habitual constipation, abdominal irritation, and abdominal plethora; in bronchial catarrh with irritating cough; in gravel and chronic catarrh of the bladder. One to five or six glasses of whey are taken at shorter or longer intervals, but they

are also used as baths, either alone or mixed with sulphur water, which produces a more calming effect.

Although I have tried to give a very short outline of the therapeutic value of the justly celebrated watering places in the Pyrenees, and merely to point out the class of diseases which may find their relief, this paper has considerably exceeded the proposed length. My aim was to call the attention of those who know nothing or very little of the subject to the beneficial springs and the beautiful scenery, and so induce them to make themselves, either personally or by books, more acquainted with the effects of these waters. They will thus not only benefit their patients but themselves, because they are sure to meet in their practice with many chronic cases in which the ordinary means are useless; and when the patient cannot go to the Pyrenees, artificial sulphur baths will sometimes produce unexpected results, still more when assisted by the internal use of mineral waters. I have already mentioned (p. 53) a case in which my experience of the treatment at the Barèges baths enabled me to treat successfully a case that, without such experience, I should have been unable to cure. May those who have read these notes be still more successful than their collector, whose work and trouble will thus be sufficiently rewarded.

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